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# South Pacific bulletin

JULY, 1960

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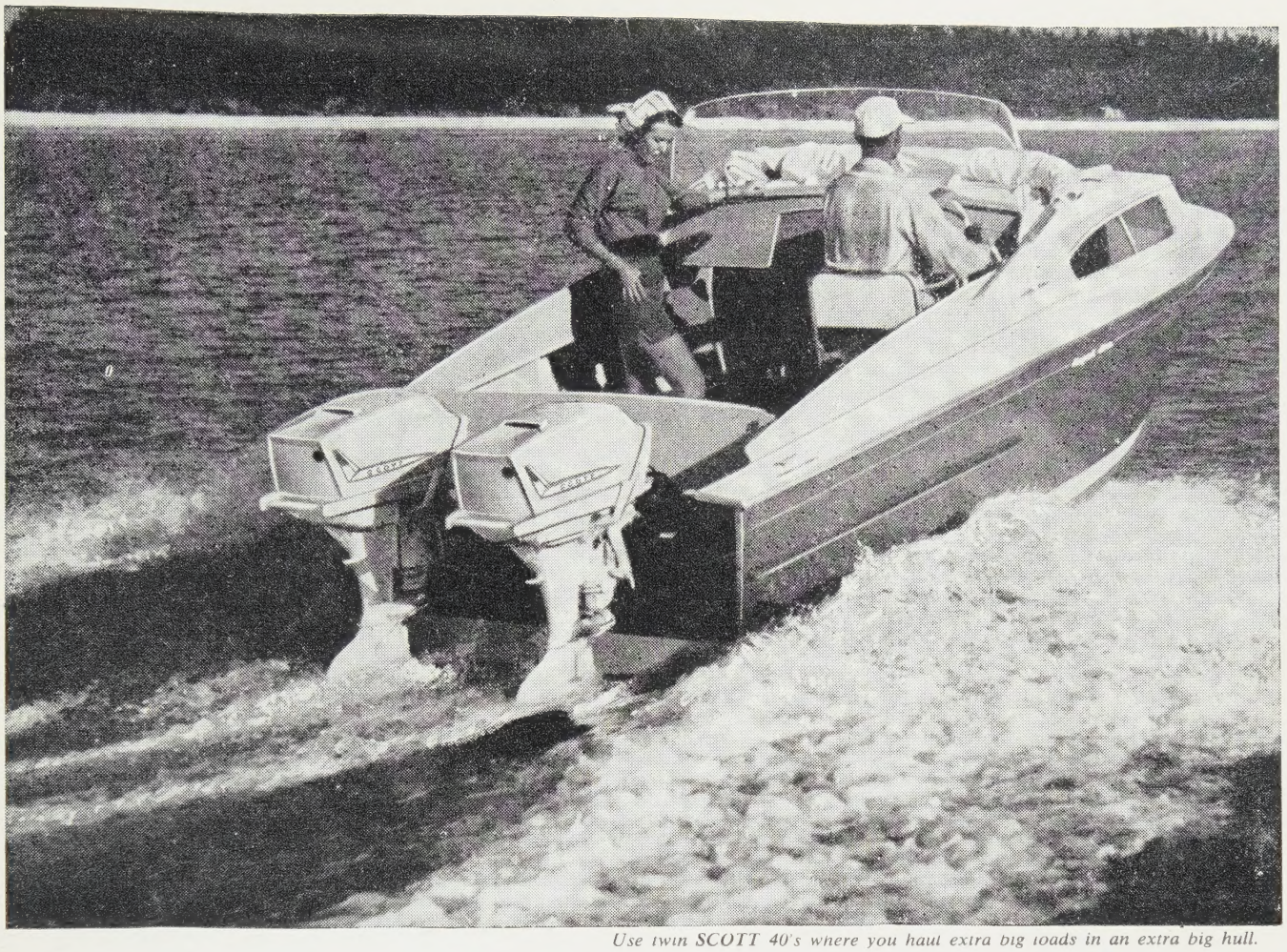

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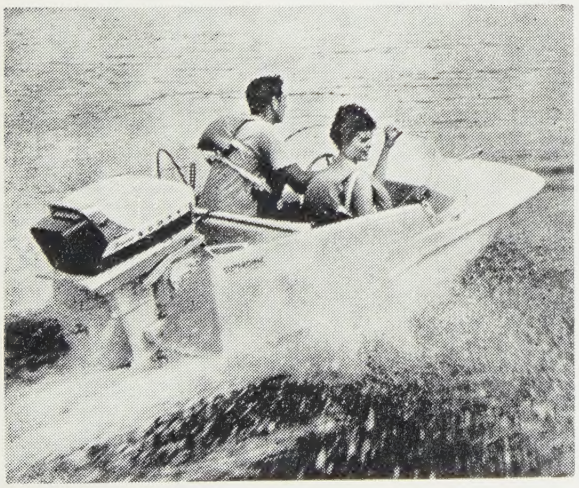

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# *The South Pacific Commission*

*The South Pacific Commission is an advisory and consultative body set up in 1947 by the six Governments responsible for the administration of island territories in the South Pacific region (Australia, France, the Netherlands, New Zealand, the United Kingdom and the United States of America).*

*The Commissions purpose is to advise the participating Governments on ways of improving the well-being of the people of the Pacific island territories. It is concerned with health, economic and social matters. Its headquarters are at Nouméa, New Caledonia.*

*The Commission consists of not more than twelve Commissioners, two from each Government. It normally holds one Session each year. There are two auxiliary bodies, the Research Council and the South Pacific Conference.*

*There is a Research Council meeting once a year. This may be either a meeting of the full Council, or of one or other of its three main sections, specialising in the fields of health, economic development and social development. Members of the Research Council are appointed by the Commission. They are selected for their special knowledge of the questions with which the Commission is concerned, and the problems of the territories in these fields. The chief function of the Research Council is to advise the Commission on what investigations are necessary. Arrangements to carry out those that are approved are the responsibility of the Secretary-General and other principal officers.*

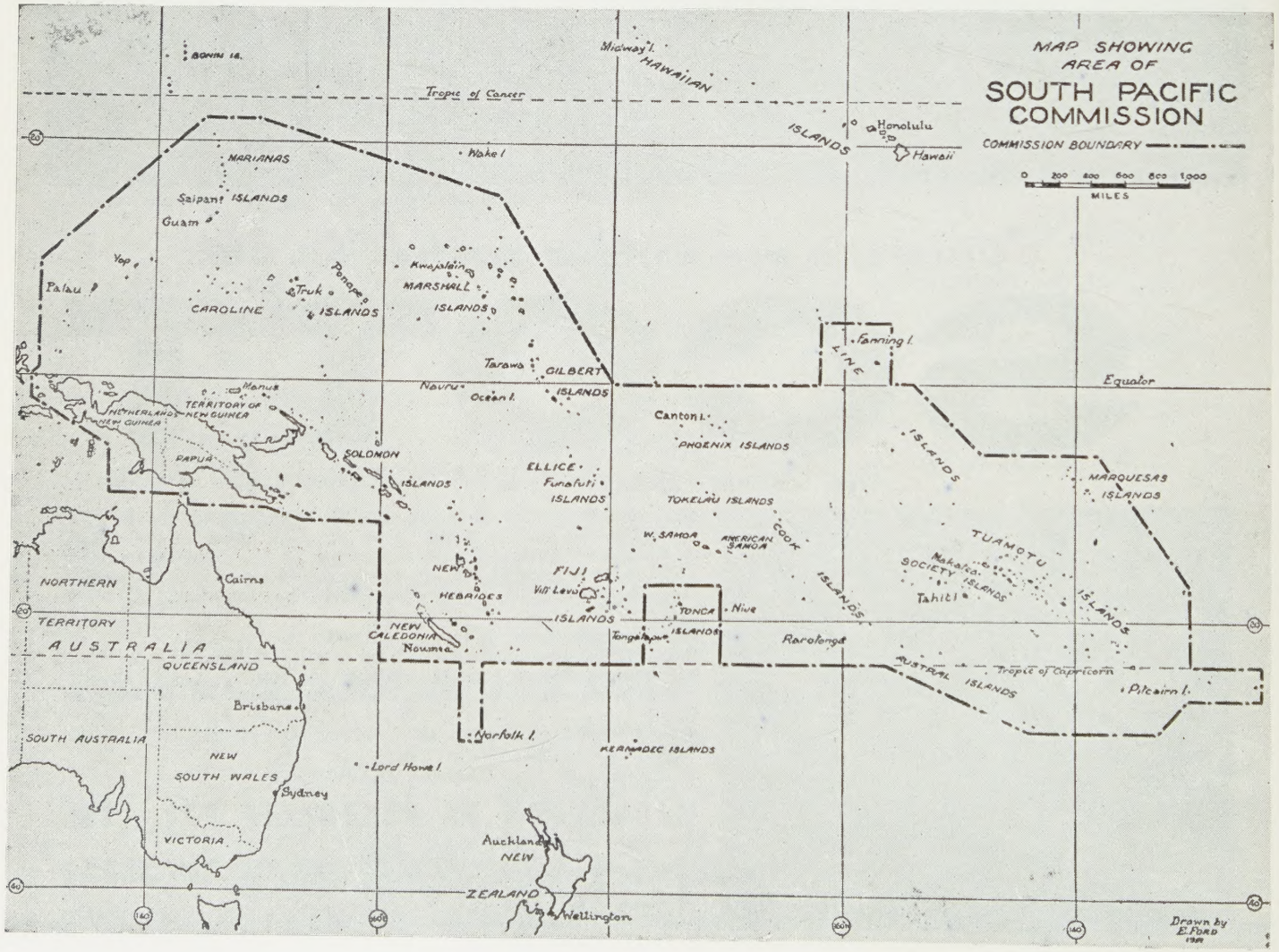
*The South Pacific Conference, which meets at intervals not exceeding three years, consists of delegates from the local inhabitants of the territories, who may be accompanied by advisers. The first Conference was held in Fiji in April 1950, and was attended by delegates from fifteen territories and from the Kingdom of Tonga. The second Conference was held at Commission headquarters in April 1953. The third Conference was held in Fiji in April-May 1956, and the fourth Conference in New Britain in April-May 1959.*

*The principal officers of the Commission are: Secretary-General, Mr. T. R. Smith; Executive Officer for Health, Dr. T. K. Abbott; Executive Officer for Economic Development, Dr. Jacques Barrau; Executive Officer for Social Development, Dr. Richard Seddon. The powers and functions of the Deputy Chairman, Research Council, are exercised by the Secretary-General.*

## *FRONT COVER PHOTOGRAPH*

Visitors from the cruise ketch "Maroro" on the beach at Balia Island, one of many beauty spots in the Great Astrolabe Lagoon, Kadavu, about sixty miles from Suva. Tourist spending in Fiji is likely to exceed one million pounds this year, according to the author of the article in this issue entitled "Tourism: Fiji's New Million-Pound Industry."

Ways in which the South Pacific Commission could encourage the tourist industry in the Pacific were recommended by the fourth South Pacific Conference of island peoples held in Rabaul, New Britain, in April-May of last year.



# SOUTH PACIFIC BULLETIN

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EDITOR: *A. E. Read, B.Sc.*

*THE SOUTH PACIFIC BULLETIN, first published in January, 1951, features articles on selected activities in the Commission's three main fields of operation: economic development, health and social development. Articles are also contributed by specialists working in these and related fields, in the territories within the Commission area.*

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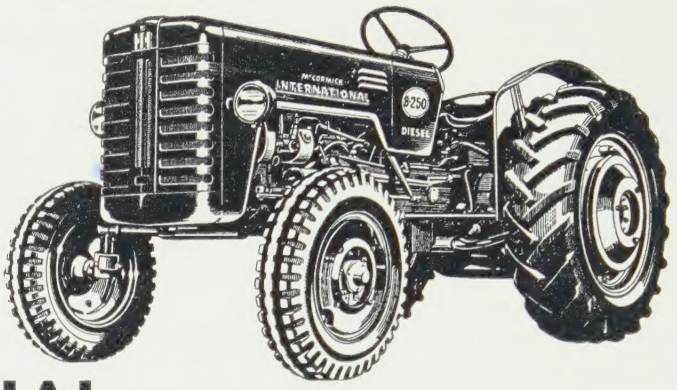


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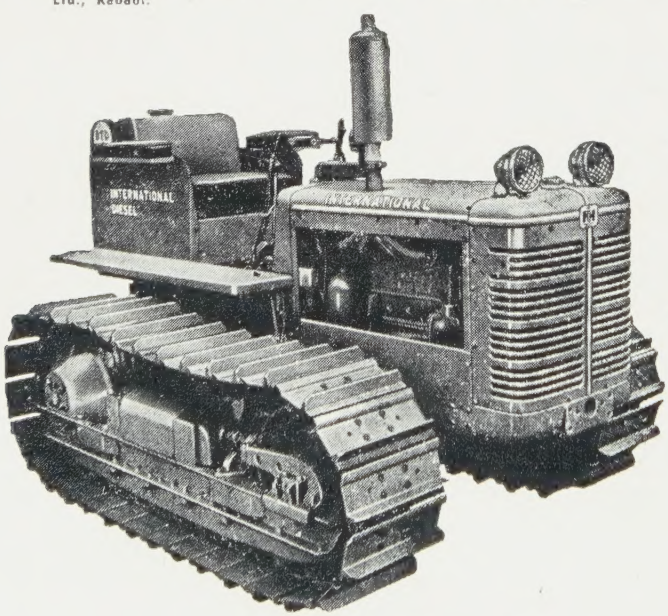


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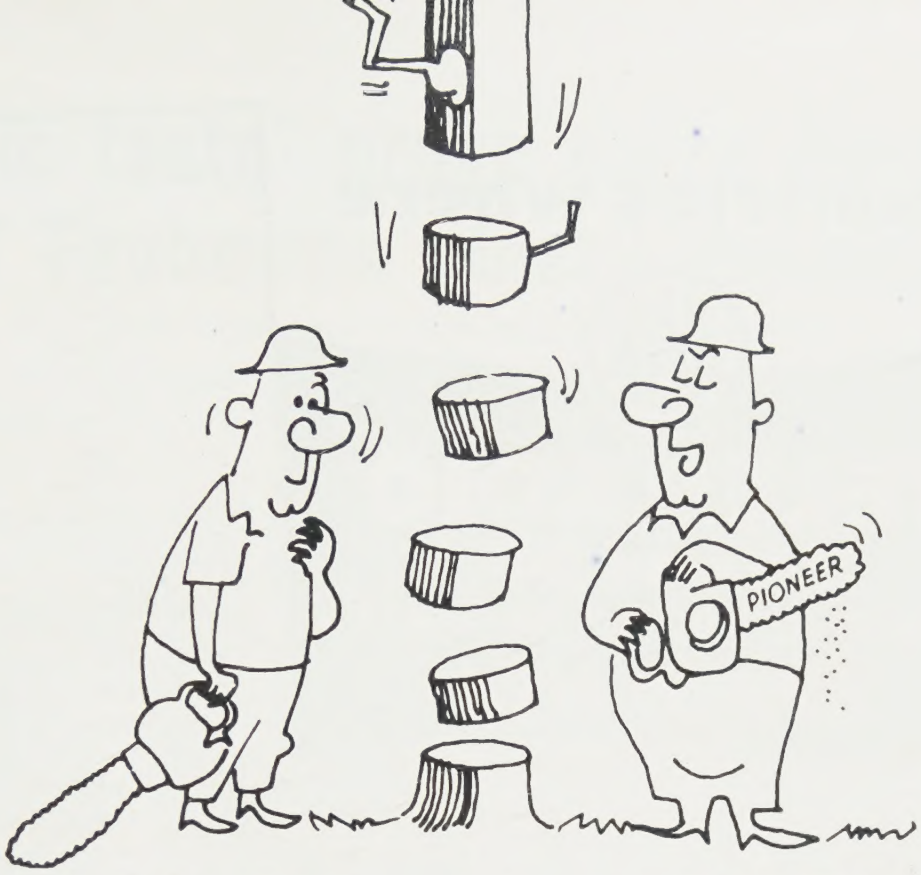


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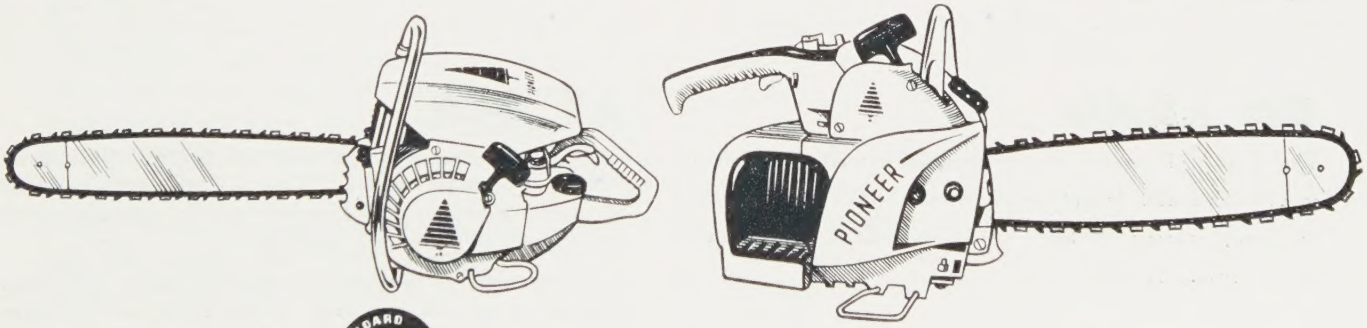


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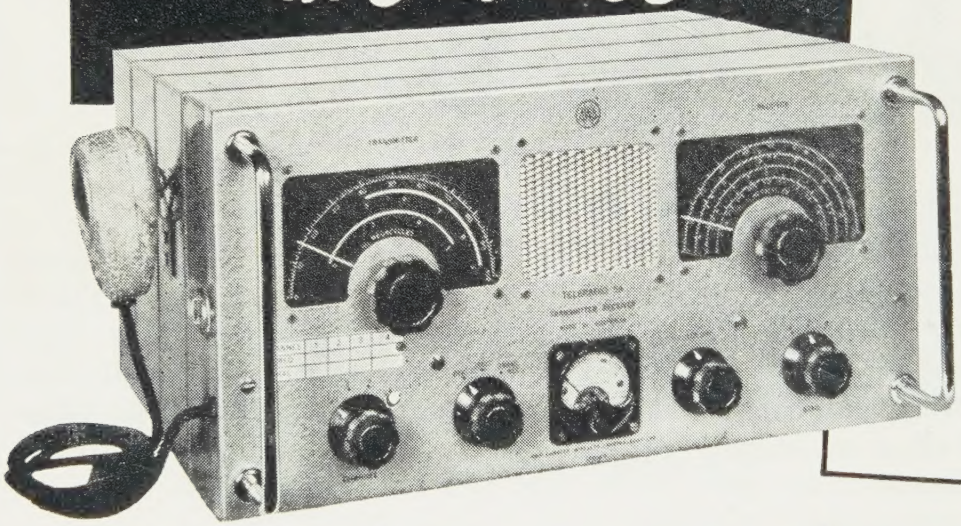

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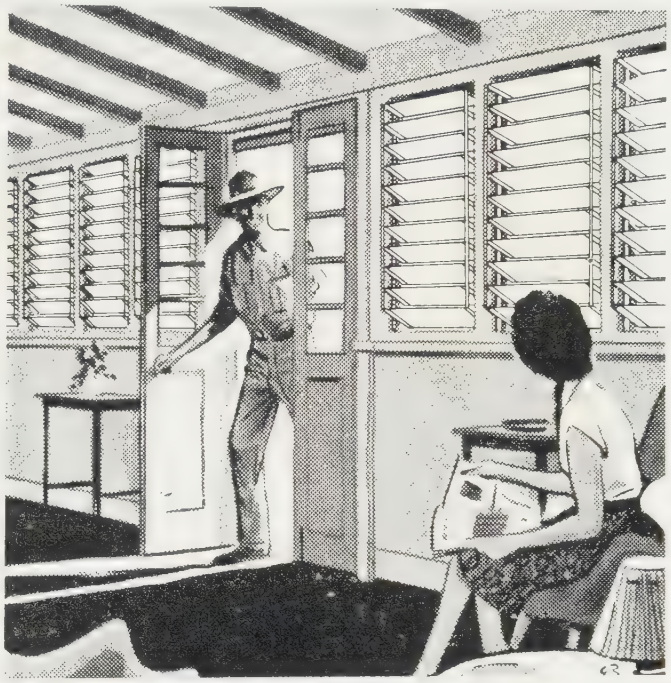

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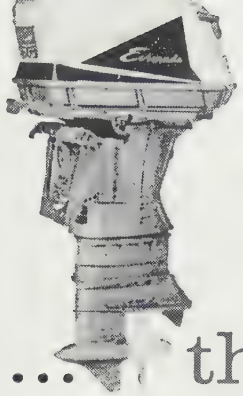

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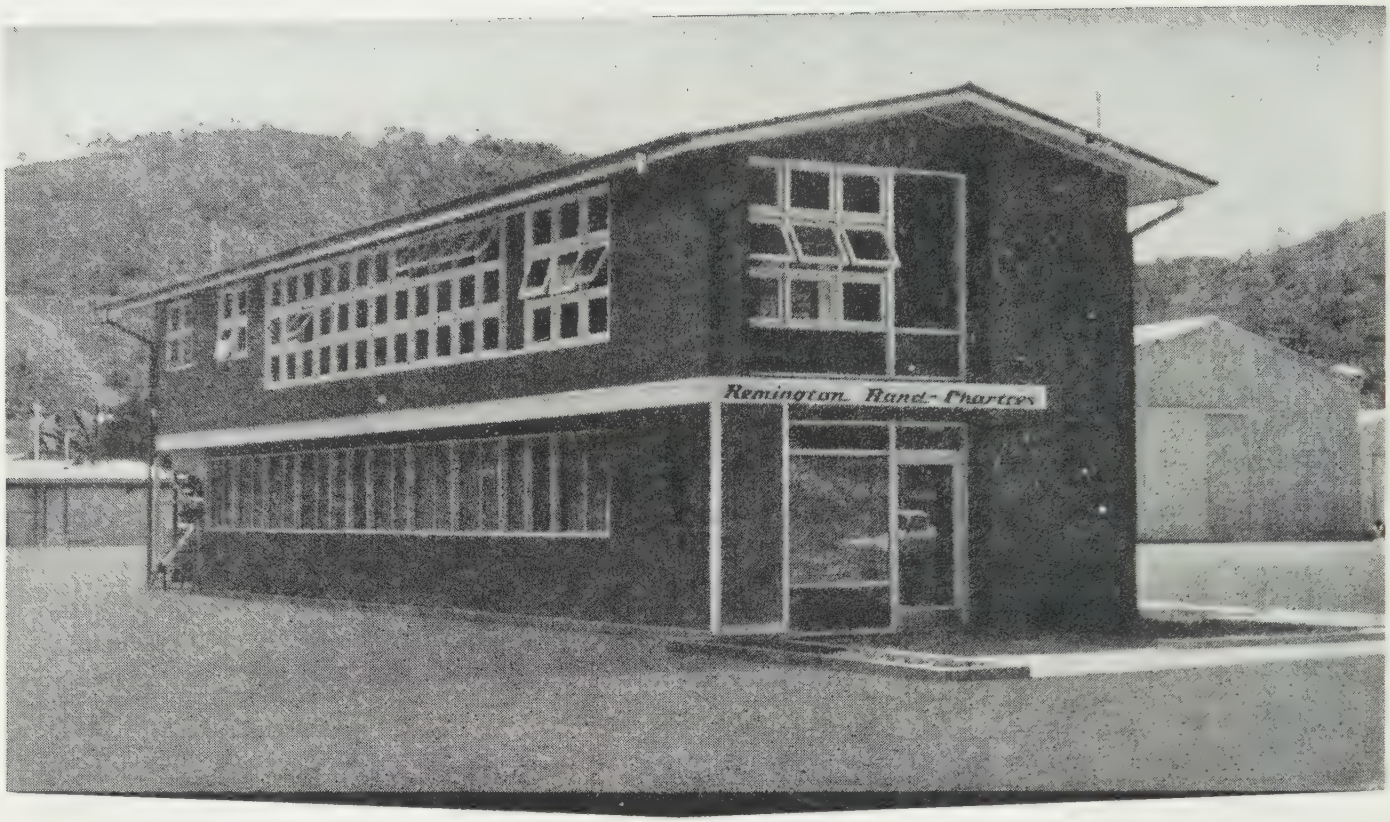


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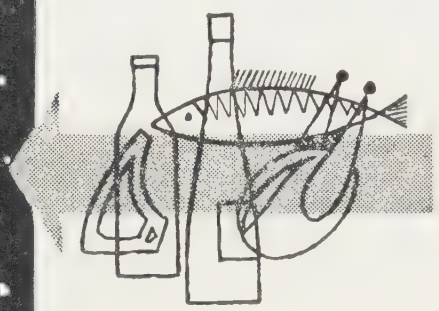

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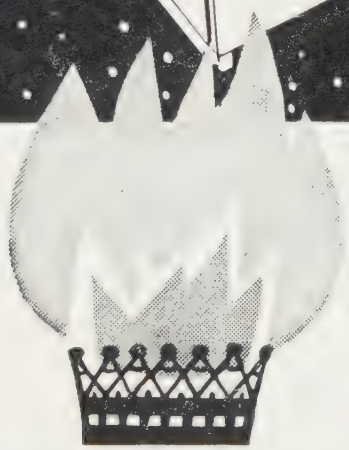

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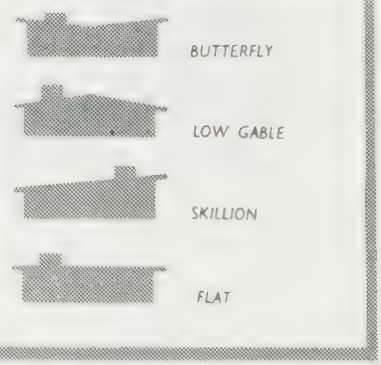


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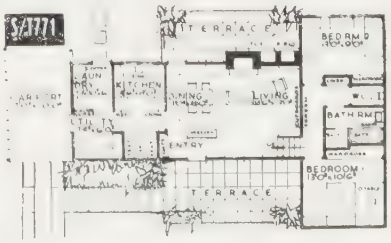


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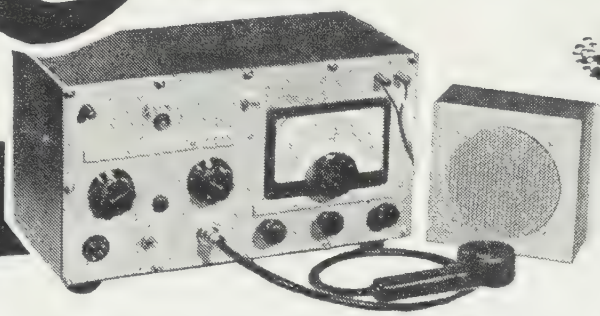

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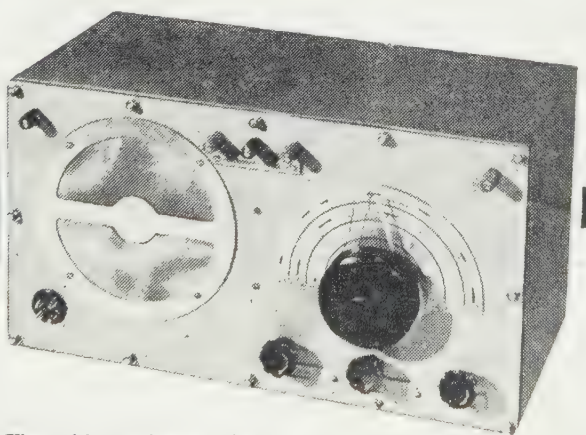

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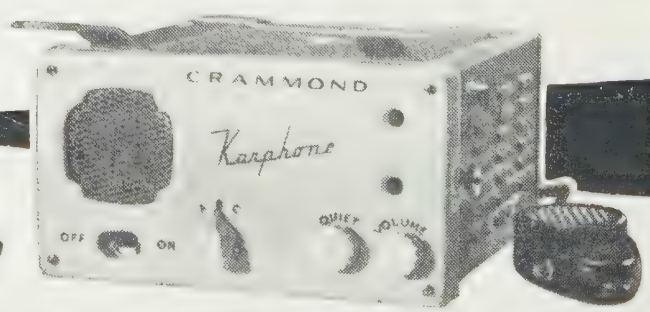


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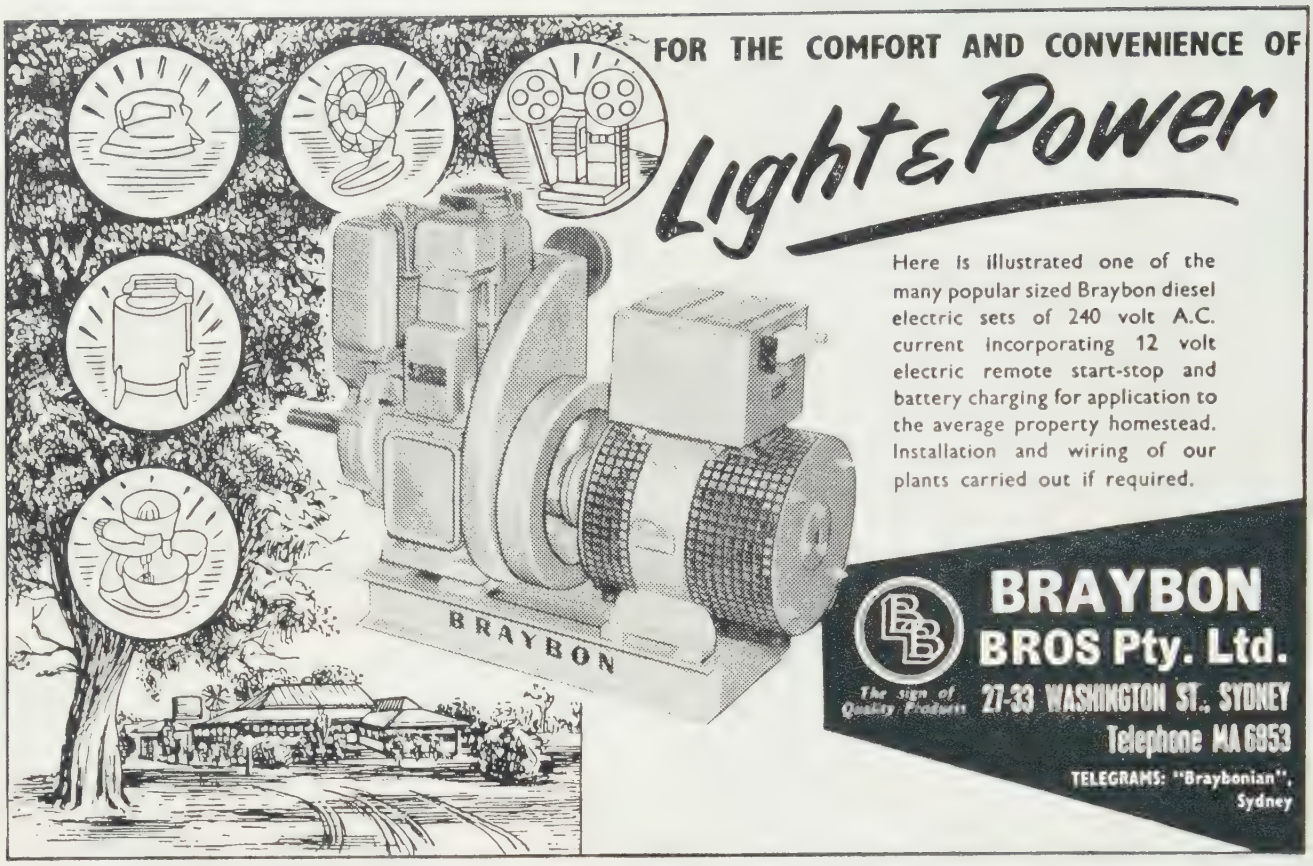


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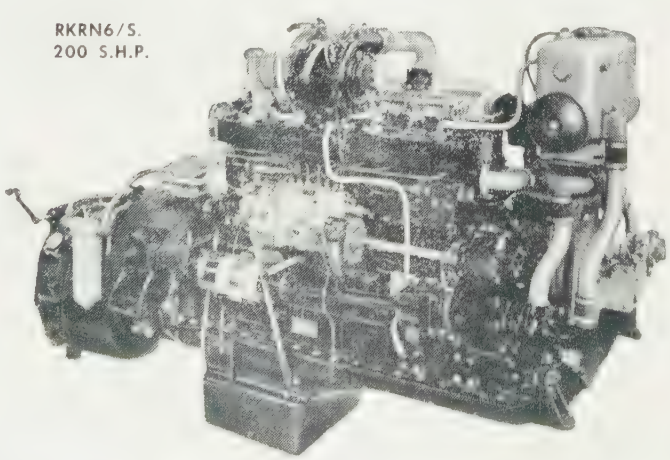

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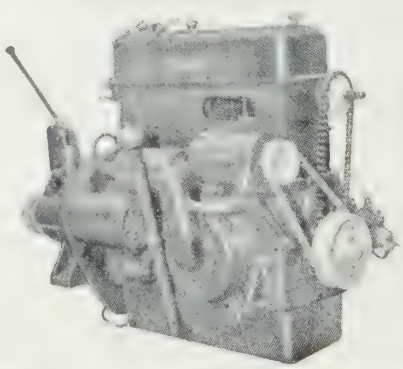

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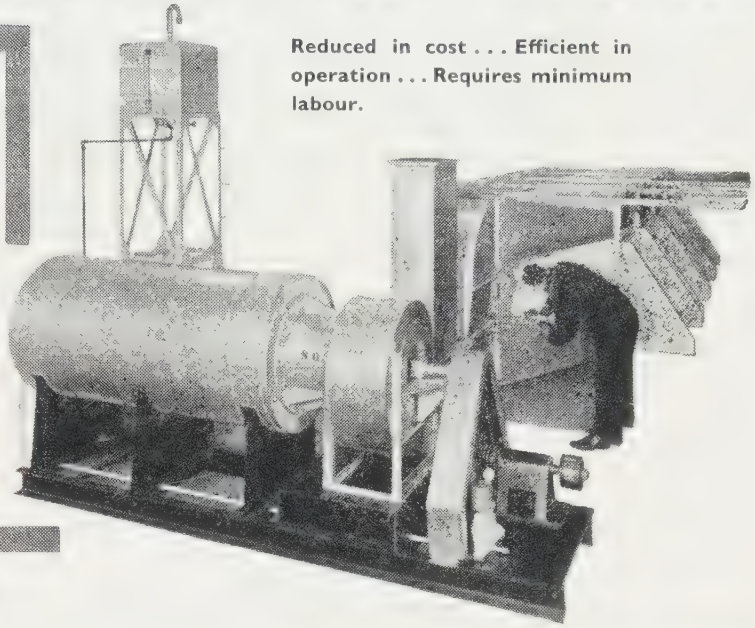

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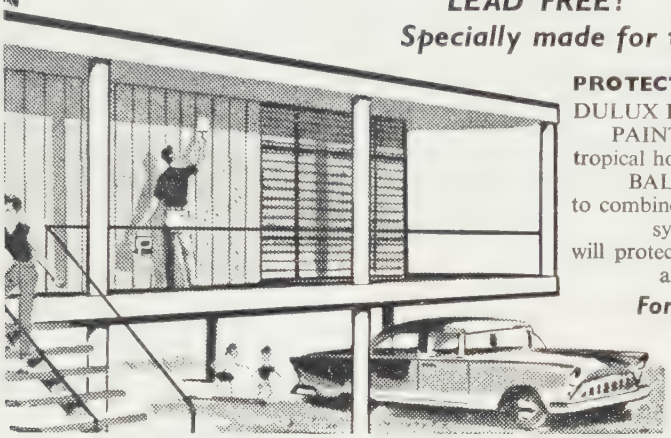

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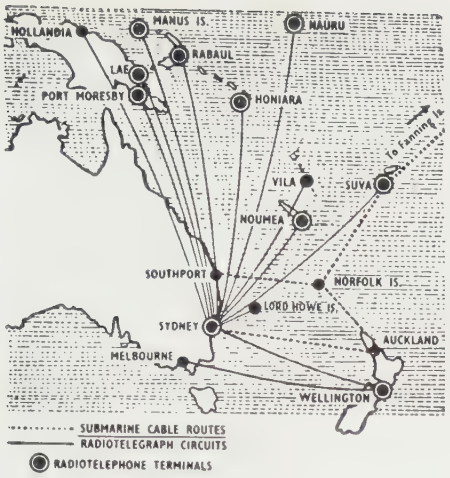


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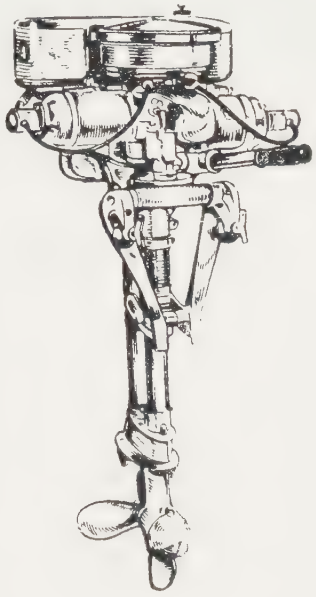

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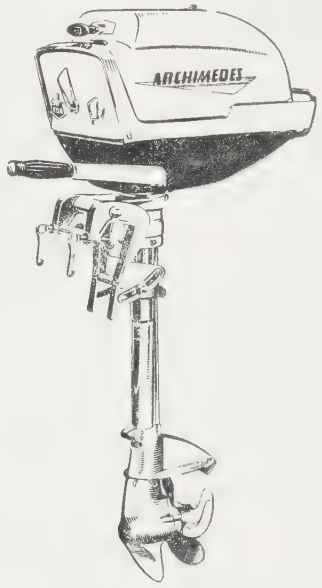


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The volcano on Tanna Island is surrounded by a sea of scoria, pumice and ashes.

# The New Hebrides

*This brief review of the New Hebrides, covering historical background, early development, resources, exports, present economic status and future possibilities, was prepared by the author following a recent visit he made to the Group to study prospects and problems of agricultural development there.*

By JACQUES BARRAU*

IN their quest for fabulous kingdoms overflowing with gold and riches, Spanish sailors of the sixteenth and seventeenth centuries set sail to explore the Pacific. Thus in 1606, Quiros dropped anchor off an unknown land which he thought to be part of a vast Austral continent. With great ceremony he named it *Tierra Austrialia del Espiritu Santo,* and decided to found a colony whose capital was to be a great city called "New Jerusalem."

Alas, the enthusiasm of Quiros and his men soon abated under the hostility of the natives and the climate. Everything seemed to oppose their plans, and it was decided to sail towards more clement lands.

The years passed, and no other European came to visit the so-called Austral continent. In 1768 the French navigator, Louis Antoine de Bougainville, sighted the land discovered by Quiros. However, it was not until 1774 that Captain James Cook realized that the "Austral Continent" of Quiros was but an archipelago, which he named "The New Hebrides".

Later, at the beginning of the nineteenth century, attracted by the valuable sandalwood found in the area, the Europeans overcame their fear of these untamed islands. From then on they became increasingly interested in the resources of the Archipelago.

### Physiography And Geology

The New Hebrides Group is situated between 13° and 21° South and between 160° and 171° East. With the Torres and Banks Islands, which are today included under the same Administration, they number some 65 islands of varying importance. Their total land area is about 4,630 square miles, of which Espiritu Santo, discovered by Quiros, represents more than one-third.

A geologist, Aubert de la Rue, in a striking and concise definition, described the New Hebrides as "islands of ashes and coral". These are indeed the two materials of which the islands are mainly composed. Here and there, however, the ancient shelf outcrops, exposing various types of rock including serpentines and granites.

In the Archipelago there is considerable volcanic activity. Besides numerous smoke holes, sulphur springs, hot springs and so on, there are several live volcanoes which play a predominant part in native beliefs and superstitions.

The topography of most of the islands comprises rugged hills and high mountains, the highest of them Mount Tabwemasana in Espiritu Santo, close on 6,000 feet. There are few plains: mainly coastal terraces and tablelands, often cleft by deep canyon-like valleys gouged out by the rivers.

### Climate And Vegetation

The New Hebrides Group lies in the southern trade wind belt. On the coast the temperature shows little variation among the islands, the average being between 68 F. and 86°F. Relative humidity is high, especially in the northern islands; it is more than 85% during most of the year. Rainfall varies considerably from north to south—approximately 80″ and 160″ annually.

* Executive Officer for Economic Development, South Pacific Commission.

Coconut plantation on a coastal coral plateau. Efate Island.

The coconut is the main cash crop of the New Hebrides. Left: A new plantation on Espiritu Santo. Right: A fairly good type of palm there.

Between December and April the islands are often exposed to violent cyclones. The most recent occurred in December 1959, causing serious damage in the island of Efate, where Port Vila, administrative centre of the Group, is situated.

Especially in the northern islands, the vegetation of the coastal areas gives the impression that tropical rain forests, or secondary forests—in appearance equally luxuriant—are predominant. But in fact as one progresses inland it is soon noticed that herbaceous formations of the savannah type are just as important. Undoubtedly these are often the result of native agricultural methods. On the highest spots the forests gradually give way to mossy scrub wood.

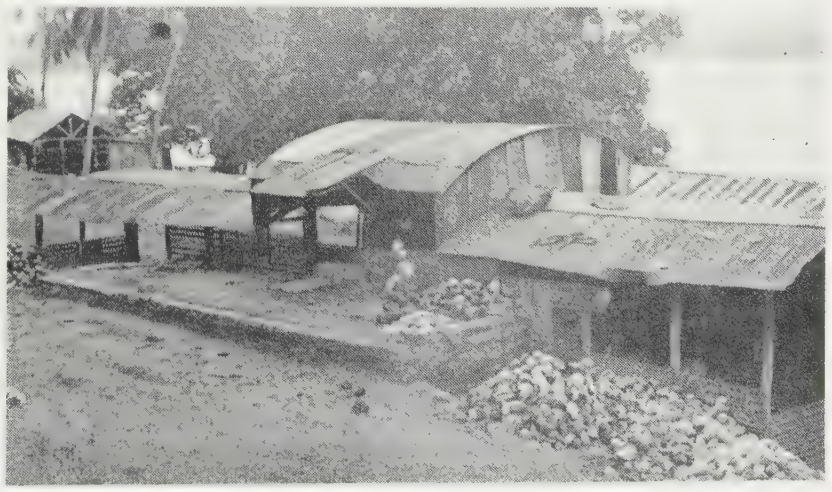
It is interesting to note that a conifer of economic importance, *Agathis obtusa*, a kauri pine, is found in New Hebrides forests, at least in some of the islands. It is in fact, with sandalwood, the only timber which is today exploited commercially for export.

### First European Commercial Ventures

Until the beginning of the nineteenth century the New Hebrides knew only a subsistence economy, similar to that of other Melanesian islands. As already mentioned, protected by their bad reputation they were rarely frequented by Europeans, who became interested in their resources only after the discovery of sandalwood in the southern islands. In 1829 the export of sandalwood was thriving with the help of labour imported from Polynesian islands such as Tonga and Rotuma. At about the same time other Polynesians arrived in the New Hebrides as missionaries. Thus from 1839 to 1848, the local staff of the London Mission Society was mostly Samoan.

In truth, the nineteenth century was one of the darkest periods in local native history: traders introduced alcohol and

A striking example of the small sized coconuts commonly found in the New Hebrides. Espiritu Santo.



Smoke driers are widely used to make copra on coconut plantations in the New Hebrides. Left, on Efate Island; right, on Espiritu Santo.

The Department of Agriculture in the New Hebrides has established several stations where plant material is introduced and propagated. Left: The pepper collection at Tagabe Station, near Port Vila, was established with material sent from the Nadurulouloulou plant introduction and quarantine station in Fiji. Right: Cocoa nursery in Espiritu Santo, where material from the Imperial College of Agriculture, Trinidad, and from Nadurulouloulou is propagated.

firearms into the islands, and even went so far as to provoke wars between the natives for their own gain. The Europeans also brought diseases which took heavy toll of the indigenous population.

Finally, as European commercial agriculture developed in the neighbouring territories and created a need for labour, from 1863 on it became the habit to procure this in the New Hebrides. Practically all the adult male populations of certain islands—Tanna for example—left to work on the plantations in Queensland. As well, the Fiji Islands and New Caledonia made use of this labour, which was usually recruited by unscrupulous methods. It is a fact that during this period the "blackbirders" were largely responsible for the depopulation which was very noticeable in these islands.

## Population Slowly Increasing

There is still much to do in the fields of public health, social and economic development in the Group. However, the living conditions of the indigenous population are today improving and the population is increasing. In 1946 there were 48,914 inhabitants; in 1956 the population was estimated at 50,336. Nevertheless it should be emphasized that this rate of increase—0.3%—is the lowest of all the territories of Oceania, and is not based on the native population alone.

As a matter of fact, of this total of 50,336 there are almost 4,000 aliens, more than half of them Europeans and the rest Vietnamese or Polynesians who came to work on European plantations.

Part of the nursery at the Tagabe introduction station, near Port Vila.

## Commercial Agriculture And European Colonisation

Sandalwood and labour recruitment having given them a foothold in the Archipelago, the Europeans became aware that other resources were available for exploitation, beginning with the coconut.

At first, as in other Pacific islands, traders exported coconut oil extracted by primitive methods; later, around 1870, the export of copra replaced that of oil. The nuts were collected in the existing populations of trees.

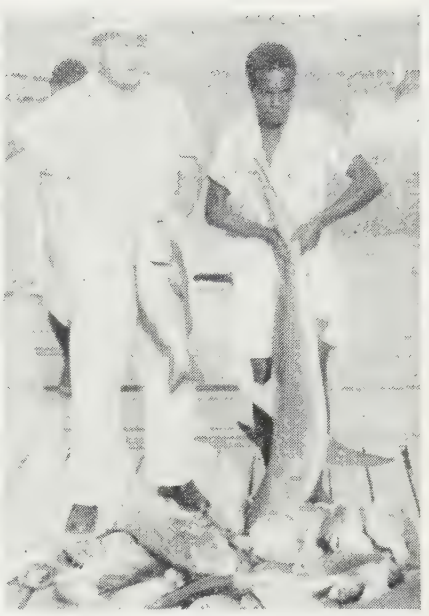
Then grew the idea of creating plantations. Possibly the nuts which were not used for copra making because they were too small, served to establish these. It is thought by some that this accidental reverse selection could explain the remarkable smallness of the majority of coconuts produced today in New Hebrides plantations.

It was really from 1870 that the Europeans began to take an interest in the agricultural potentialities of the Archipelago. The foundations of a true colonisation were then laid, one of the leaders being John Higginson, who also played a prominent part in the European settlement of New Caledonia.

## Present Exports Of The New Hebrides

Several cash crops were tried, including cotton, maize, cocoa, and coffee. The only three which finally achieved any degree of permanence were coconuts, cocoa and coffee. Just before the last War there were in the Archipelago about 62,000 acres under coconuts. Cocoa plantations covered an estimated 11,000

*(continued on page 55)*



Above: Some of the agricultural officers and assistants who attended the fish preservation course, with part of the catch—mainly snapper and shark—taken by handline for fish preservation demonstrations. Right: The author with Assistant Fisheries Officer Nelson Niolo, who attended the SPC fisheries training course held in Noumea in 1957. Right, lower: A yellowfin tuna taken by Mr. van Pel by trolling during his Solomons investigations.

# SPC Fisheries Investigations In Melanesia

*Early this year the Commission's fisheries officer spent nine weeks in the British Solomon Islands, Papua and New Guinea, and Netherlands New Guinea, where at the invitation of the Administrations he studied and advised on fisheries development. In this article he briefly reports on his investigations.*

By H. VAN PEL

I ARRIVED at Honiara in the British Solomon Islands early in January, and at a one-week refresher course for agricultural officers and assistants, gave lectures and practical demonstrations on fish preservation by smoking, salting and artificial drying.

The fish needed for the demonstra-

Below: Artificially drying fish flakes during the fish preservation demonstrations. Right: Gutted, salted fish being placed on spits for smoking in the kiln just visible at right.

"Kemboong", the first motor fishing boat built at the Seafisheries Station in Hollandia, engaged in trawling. Right: Three more motor fishing boats of the same design now being built at the Station.

tions were caught by the students and instructor the day before the course started, when more than enough were taken by handline for the whole week.

While I was in the Solomons, a possible site was found for the training course in practical fisheries which the Commission may hold there in 1961. Suggestions were also made to the Administration for fisheries development.

### Visit To Netherlands New Guinea

Late in January I left Honiara for Hollandia. In Port Moresby I was joined by Dr. A. M. Rapson, Chief of the Division of Fisheries of Papua and New Guinea, who accompanied me to Netherlands New Guinea.

In Hollandia we met Mr. W. A. Mackenzie, Head of the Seafisheries Division, and Mr. de Vries, Head of the Inland Fisheries Division. A meeting was held with officers of the Department of Agriculture and Fisheries. The future development of fisheries in Netherlands New Guinea was discussed, while Dr. Rapson advised on the work being done in his territory.

At the Seafisheries Station in Hollandia several small motor fishing boats

Views of the fishponds constructed at Sentani in Netherlands New Guinea. Left: Dam from which water is piped to the ponds, centre. Right: Channel connecting fishponds.

Below: Fishing with seine net in one of the fishponds at Dobel, in the New Guinea highlands. Right: Two Singapore carp from a Dobel pond.

Left: Dr. Rapson and the author brought Cantonese carp fingerlings from Sentani by air to the Dobel ponds in a plastic bag placed in a cardboard carton. Lower: Freshening up the water on arrival.

Right (top to bottom): Fishing for tilapia with a gillnet in a fishpond at Bomana, Papua. Part of the catch of tilapia, which averaged ½ lb. each. Trout are thriving in this stream in Goroka, 8,000 feet above sea level.

being built for use by local fishermen were inspected. Overall length is 27′ 6″, and they are powered with an 18 h.p. diesel engine. One boat had already been completed, and the fishermen operating it gave us a demonstration of trawling.

A new motor boat was also being built at a nearby yard for transporting fish from the outlying islands to Hollandia, where the new fish market was completed during our visit. The supply of fish to Hollandia is increasing, the main catches being of tuna and mackerel.

A visit was made to the freshwater fisheries station at Sentani, where there are now sixteen experimental fishponds. The fish raised there are giant gouramy, sepat Siam, *Tilapia mossambica,* and different types of carp. Distribution of fingerlings of some species is already taking place.

### Return To Papua And New Guinea

On our return to Papua and New Guinea, Dr. Rapson and I took with us from Hollandia some young Cantonese carp for the experimental fishponds at Dobel, in the New Guinea highlands. At this fish farm there are ten fishponds stocked with *Tilapia mossambica,* Singapore carp and giant gourami. So far the Singapore carp have not reproduced, but growth is very satisfactory.

Next, the Omahaiga River near Goroka was visited. This river has been stocked with rainbow trout, which are reproducing at an altitude of 8,000 feet. The water temperature during our visit was 39.2°F.

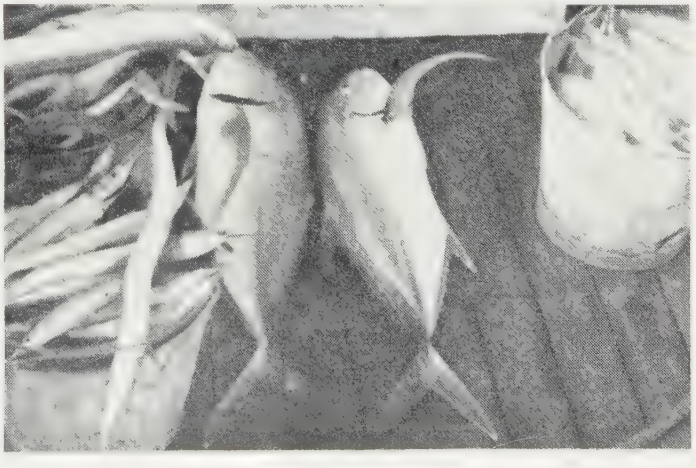
On February 8 the Kuminakera Swamp near Aiyura was investigated. Situated at an altitude of 5,800 feet, this swamp of two square miles was considered suitable for fishponds. There is already one pond in Aiyura with an enormous quantity of tilapia.

On February 9 the Animal Industry Centre at Goroka was visited, and the Manager advised on the construction of three fishponds. The fish from these will be used as supplementary feed for pigs.

When we returned to Port Moresby, great quantities of spiny lobsters were being brought in. The fisheries research vessel *Tagula* landed about 2,500, all caught by hand and spear. The season —which usually lasts there from December to February—was exceptionally good for spiny lobsters.

A meeting was held in Port Moresby

A small nylon beach seine net being tried out at a fishing village on the south coast of Papua. Right: Part of a catch of garfish, trevally and half-beak, taken in one haul.



Left: A barramundi caught off the Papuan coast. It is an excellent eating fish. Above: Spiny lobsters for sale at the Kuki Market in Port Moresby.

for native fishermen to discuss fisheries development generally.

### Visit To Samarai

With Dr. Rapson, I made a trip in the Administration vessel from Port Moresby to Samarai. On the way we fished with trolling lines, and Spanish mackerel, barracuda and trevally were caught. During the trip we visited several fishing villages, where demonstrations of fishing with a shallow beach seine made of nylon were given. Good catches of garfish, long Tom, bream, trevally, mullet and barramundi (*Lates calcarifer*) were made. All the fish were kept in ice.

At Hula, a village of about one thousand inhabitants, a meeting was held with the local fishermen. Their problem was the marketing of their fish. The Fisheries Division has a kiln here for the smoking and drying of *bêche-de-mer* (trepang). The Hula fishermen use huge double canoes, and often fish near Port Moresby, selling their catches in the Kuki Market there.

On the islands near Samarai there were many privately-owned boatbuilding yards. Boat building is of great importance to the future development of fisheries.

### Demonstration By Milne Bay Fishermen

We went on to Milne Bay, in the eastern part of Papua. We stopped at Gaba Gabuna where we held a meeting with the local counsellors and fishermen. Here again the problem is marketing.

The following morning the fishermen gave an impressive demonstration of catching big mullet with a surrounding net. Eighteen canoes, seventeen rafts and two catamarans were involved, about sixty fishermen taking part. Their teamwork was perfect.

After a school of mullet had been surrounded, seventeen raftnets were placed around the surrounding net and the mullet jumped on to them. About 300 mullet were taken.

### Concluding Visits

The last few days of my stay in the territory were spent in districts around Port Moresby. Bumana fishpond was fished with a gillnet, many half-pound *Tilapia mossambica* being taken.

A brief visit was made to the rubber plantations near Koitaki, where there are fishponds stocked with *Tilapia mossambica*. The plantation workers with their women and children were fishing with pole and line. Here, tilapia is very much appreciated as a food.

## Beetle Predator Flown From Africa To Fiji

For twelve months Dr. C. P. Hoyt, Commission entomologist, has been searching in tropical Africa for parasites and predators of the coconut rhinoceros beetle.

He has identified several that could be useful in the fight against the beetle in the Pacific. One of them found in Eastern Nigeria, *Neochryopus savagei*, preys on the larvae of the local species of rhinoceros beetle, *Oryctes sjostedti*. In May last Dr. Hoyt sent by air to Fiji a shipment of 127 of them, and 117 survived the long journey. In Fiji the senior entomologist of the Department of Agriculture, Mr. B. A. O'Connor, has released 113.

It is hoped that other shipments of *Neochryopus savagei*, as well as of other species of insects preying on African rhinoceros beetles, will shortly be made not only to Fiji but also to other South Pacific territories.

## Encouraging Trap Fishing Investigations In Cook Islands

Encouraging results from an experiment in trap fishing are reported from the Cook Islands by fisheries officer Ronald Powell.

The traps, simply made from wire netting covering a frame of steel rods welded together, are of a type he saw successfully used by trap fishermen in Hawaii. His experimental traps measure 6ft. x 4ft x 3ft. 6in., which is the maximum size it is practicable to handle from the 18-foot motor boat used. They each weigh 220 pounds, and are lifted by a small seaplane winch and ¼in. stainless steel cable, fitted with a grapnel.

During the six-month period of the experiment, almost every variety of common reef fish was caught. Large Moray eels up to 68 pounds were often taken, as were crayfish, both being in brisk demand on the local market.

As a result of his investigations Mr. Powell considers that trap fishing has definite commercial possibilities in Rarotonga.

Speakers at the opening. Left to right: Sir John Gutch, who formally opened the Centre: Mr. T. R. Smith, Secretary-General of the South Pacific Commission; and Dr. Richard Seddon, who as officer in charge of the Commission's social development programme is responsible for the project.

# SPC Literature Production Training Centre Formally Opened

*Early this year the South Pacific Commission set up a literature production training centre for Pacific islanders at Honiara, in the British Solomon Islands. Twelve trainees from six Pacific territories are now attending the first of three one-year courses. The Centre was formally opened on March 18 by His Excellency Sir John Gutch, K.C.M.G., O.B.E., British High Commissioner for the Western Pacific, in the presence of some eighty guests.*

The High Commissioner was welcomed in a brief introductory speech by the Secretary-General of the South Pacific Commission, Mr. T. R. Smith, who said it would give him genuine pleasure to call upon His Excellency to open the Centre. This was because not only as head of the territory had Sir John welcomed the proposal to site the Centre there, but also because as the Senior British Commissioner he had presided over the South Pacific Commission when the plans for the Literature Production Training Centre had taken their final form and had been approved.

Speaking on the background to the establishment of the Centre and its importance to the aims of the Commission, Mr. Smith said: "The South Pacific Commission wanted to see a Centre such as this provided in order, in the first place, to demonstrate the methods available for the writing, preparation and printing of needed literature; in the second place to train island peoples themselves in the necessary skills; and

Below: Lady Gutch and the Secretary-General watch Mr. A. M. Koenen, technical production officer, demonstrate the offset printing machine. Centre: Kojrak Caleb from the United States Trust Territory of the Pacific Islands demonstrates the treadle-operated letterpress machine. Right: Kasiano Tio, from Fiji, operating the paper-folding machine.

Mr. E. P. W. Marriott, Editorial/Administrative Officer, who is in charge at the Centre, explains its operation to Sir John and Lady Gutch.

thirdly, to gain from experience, knowledge of the application of those methods in Pacific Island conditions.

"The United Nations Educational, Scientific and Cultural Organization", Mr. Smith continued, "has sympathized with those objectives in a very practical way by providing necessary funds and abundant, well-informed advice. We give that Organization our thanks, as we thank also this Protectorate and Her Majesty's representative who heads it, for the major part they have played in making this Centre possible".

### Centre Planned To Meet An Acute Problem

In addressing the gathering before declaring the Centre open, Sir John Gutch said that the project had been designed to meet a problem which was being acutely felt in the Pacific territories—the provision of literature for an area which, although comparatively small in population and with many similar interests, comprised hundreds of different language groups and varying traditions and cultures. "By literature", continued Sir John, "is meant, of course, not only books for general reading, but the whole range of printed material necessary for use in schools and training centres, in adult extension work, and for publicity in many different fields of activity, such as health and agriculture as well as education".

Sir John referred to the early interest of his own Government in the project as first tentatively proposed by the Commission in 1957, and stated that early in 1959, funds for UNESCO participation had been made available by the United Nations Technical Assistance Board. Since then the project had gone steadily forward, staff had been engaged, buildings completed, equipment ordered and installed, and the trainees chosen and transported to Honiara.

"The scheme represents co-operation in several aspects", Sir John continued. "The South Pacific Commission, itself representative of Australia, France, the Netherlands, New Zealand, the United Kingdom and the United States, has provided inspiration and expert guidance and is subsidising the costs of trainees. UNESCO—again an international body—is providing the staff and equipment and also half the costs of the trainees. The Protectorate Government, through a Colonial Development and Welfare grant from the United Kingdom, is financing the cost of the buildings and their maintenance. The different Pacific territories—in the case of the first course, Papua and New Guinea, Fiji, the Cook Islands, the United States Trust Territory, Western Samoa and the British Solomon Islands—are providing that most essential element, the human material.

"I need hardly say", continued Sir John, "that the British Solomon Islands Protectorate has been delighted to be the host territory for this project, and will continue to do all that it can to ensure its success. It was, as I have said, designed to meet a problem posed in the field of literature by the varying languages, customs and cultures of the territories within the South Pacific Commission's orbit. I feel confident that it will solve this problem of diversity, but in doing so I am sure that it will also draw us closer together and be yet another influence promoting closer understanding and interest between the different peoples in the South Pacific. I wish the Literature Production Training Centre and all those who teach and learn therein success in their endeavours", Sir John concluded.

Sir John and Lady Gutch, with other guests, then inspected the air-conditioned printing shop and office, where trainees demonstrated the equipment installed in both.

The operation of the Centre was explained by the officer in charge, Mr. E. P. W. Marriott, and his assistant Mr. A. M. Koenen, the technical production officer.

### Trainees Taking 1960 Course

The twelve trainees from six Pacific territories taking the first one-year course at the Centre are:

*Cook Islands*: JOSEPH SAMUELA, TEAROROA ARIKI.

*British Solomon Islands Protectorate*: GABRIEL FOLIGA, FRANCIS TOHE.

*Fiji*: KASIANO TIO.

*Papua and New Guinea*: RANU NIHARA, JON KONIEL, PATRICK PAULISBO.

*United States Trust Territory of the Pacific Islands*: KOJRAK CALEB, THEODORE SIGRAH.

*Western Samoa*: LIU IOSEFA, FAGAMANU PEMERIKA.

## SPC Economist Studying Problems Of Capital Formation

Mr. V. D. Stace, economist with the economic development section of the Commission, is at present engaged in surveying the problems of capital formation in the South Pacific region. On May 24 he left headquarters for a field trip during which he will visit the New Hebrides, French Polynesia, the Cook Islands, Western Samoa, American Samoa, and finally Fiji.

## SPC Mosquito-Borne Diseases Specialist Visits French Polynesia

On April 27 the Commission's specialist in mosquito-borne diseases, Dr. M. O. T. Iyengar, arrived back at headquarters following a visit to French Polynesia, made at the invitation of the Administration.

While there Dr. Iyengar carried out field studies in Tahiti and Moorea, gave talks and practical demonstrations to the staff of the Institute of Medical Research, and drew up plans for their further technical training as well as for an intensive mosquito control campaign.

Dr. Iyengar also visited the new airport being built near Papette, to discuss steps to keep the area free from mosquitoes as required by international sanitary regulations.

# Training Course For Women's Club Leaders In Papua

*Last January, twenty-four women from fourteen villages in the Northern District of Papua attended a training course for women's club leaders held at Popondetta. The purpose and progress of the Course are described below by the Welfare Officer from the Department of Native Affairs who conducted it . . .*

PATRICIA URE

Listening to one of the lectures, given on infant and maternal health, agriculture, domestic science, and local government councils.

LAST January, a training course for women leaders was held at Popondetta, in the Northern District of Papua. The Course, which lasted eight days, was residential, and catered for twenty-four women from fourteen villages in the District.

The Northern District was chosen for this first of a series of residential courses mainly because the interested women were in need of assistance to enable them to carry on without the continual supervision of a European worker.

The women were accommodated at the Education Department Centre which, during term time, is occupied by girls attending an Intermediate school. A mature, responsible Papuan woman who has charge of these girls was present to supervise the women during the Course. She also demonstrated different ways of using native foods during the cooking of meals in the mess.

### Selection Of Trainees

The selection of women to attend the Course was made by the Anglican missionaries working in several areas, and by the Sister-in-Charge of the Infant and Maternal Welfare Centre.

Upon arrival, each woman was given a name card which she wore throughout the Course, showing her name and village. This made contact with each woman much easier, particularly in the initial stage. (One unforeseen complication of this scheme was that the badges had to be worn on the skirt, which made them a little more difficult to see).

### Medium Of Instruction

All except three of the women attending the Course were familiar with English, and even these three appeared to understand a considerable part of the instruction. The women helped each other by translating some of the more difficult points.

During the dramatisation of village legends each woman spoke in her own language, and this was then translated by some other woman into a language understood by the majority.

### Four Specialist Officers Take Part

Four Administration officers gave talks and demonstrations on infant and maternal health, agriculture, domestic science, and local government councils.

INFANT AND MATERNAL HEALTH: The Sister-in-Charge of the Infant and Maternal Health Centre in the district took two lectures with the women on many aspects of child care, hygiene and preventative medicine. She was accompanied by one of the trainee Infant Welfare nurses—a girl from the Northern District—who was able to interpret some of the more difficult points.

These lectures were invaluable because of the Sister's extensive knowledge of local customs, particularly in relation to the eating habits of the people; her exhortation on the dangers of eating rats was very well taken!

Demonstrations were given to illustrate points made during the talks—the preparation of fruit juices, purees, and soups, as well as of tinned milk for babies. The use of bottles with teats was discouraged because of the lack of a true appreciation of the necessity for sterilising them. Instead, a cup and spoon which can be easily washed in boiling water are recommended.

The children who had accompanied their mothers to the Course acted as subjects, both for bathing and for feeding demonstrations.

AGRICULTURE: The District Agricultural Officer, accompanied by a Papuan Agricultural Field Worker, spoke to the women on the growing of rice, cocoa and coffee. His object was to teach the women the right times for planting and harvesting these crops so that they, too, might help in their production and encourage their husbands to work at the right times.

At the conclusion of his talk the Agricultural Officer demonstrated the preparation of rice for cooking, using a pestle and mortar made from wood. The women practised pounding and winnowing the rice, to the accompaniment of much laughter from the spectators.

DOMESTIC SCIENCE: A Domestic Science teacher taught the women how to cook eggs, soups, stews, and scones, as

**In the domestic science lectures and demonstrations, special emphasis was placed on ways of using peanuts and coffee, which are grown in the Northern District. Left: Crushed peanuts can form a useful item in the diet of weaned infants. Centre: A baby of one of the women attending the Course samples a nutritious peanut stew. Right: Two women learn that pumpkin tips can be a valuable green food for infants and children.**

as placing special emphasis on the use of peanuts and coffee which are being grown in this District.

Many of the women taking the Course had not tasted eggs before. This is common in many districts, where because of certain taboos it is very difficult to persuade women either to eat eggs themselves, or to include them in the family diet. One such taboo asserts that if pregnant women eat eggs, their babies will be born bald!

The group was also taught how to sew babies' pants, men's shirts, patchwork, and food covers. Each village group completed one shirt, and each woman made a food cover and babies' pants.

The absence of irons in most places and the shortage of soap made it necessary for laundry lessons to dwell mainly upon the necessity for frequent washing of clothes, rather than on any of the more technical details.

LOCAL GOVERNMENT COUNCILS: A Local Government Council officer spoke to the women on the place of women in Council, stressing that the woman has as much responsibility to take part in Council activities as the man.

### Teaching Aids For The Course

BOOKS: The first issue of *The Women Of Mamayang,* printed by the South Pacific Commission, proved to be a very valuable textbook for the Course. Each woman was given a copy, in addition to a set of four programme booklets for Women's Clubs entitled *Your Family And You, How to Keep Well, Let's Plant Peanuts,* and *A Recipe Book For Pacific Islanders.*

During the Course each village group made a flannelgraph illustrating the foods which belong to the various groups —body building, protective and energy. This particular flannelgraph was one adapted from a similar one used by Miss Marjorie Stewart, SPC women's interests officer, during a visit to the Territory in 1959.

FILMS: Sufficient films for two sessions were obtained for the Course. These were very much appreciated by the women, many of whom had seen films only very occasionally before — some never. The films illustrating life in other tropical countries were particularly popular, as were Walt Disney health films which stressed points that had been made during the Course.

MUSIC: The use of a gramophone and records proved to be very valuable in providing a rest period between talks and other activities. Providing sufficient explanation was given before each record the women were very responsive. Clive Richardson's *London Fantasia* was one of the most appreciated recordings.

PHOTOGRAPHS: A selection of photographs from the Public Relations photographic library was used to illustrate various aspects of village progress in other parts of the territory. These were very effective in showing what *could* be done. As always, the women enjoyed seeing pictures of people like themselves,

*(continued on page 74)*

**Left: A field worker of the Department of Agriculture—Simon from the Mekeo District—demonstrates how rice can be hulled with a homemade pestle and mortar. Right: Winnowing the hulled rice.**

Coastal vessels at Sariba in the Milne Bay district of Eastern Papua. This slipway, which is owned and operated by Mr. F. L. Burrows, takes several hundred ships a year, of up to 150 tons. Especially in the tropics, regular and frequent slipping of wooden ships is essential.

# The Maintenance Of Wooden Vessels

*The cause and prevention of dry rot are discussed in this article by a leading Australian naval architect with extensive islands experience in the construction and maintenance of wooden ships.*

By ARTHUR SWINFIELD

ONE of the most serious problems associated with the maintenance of wooden craft is that of preventing attack by dry rot in any part of the vessel. Dry rot is a most insidious destroyer, working as it does undetected, and becoming apparent to the 'lay' eye only when its work of destruction is complete.

How does this occur? All timber contains cellulose and lignin plus other minor matter. Dry rot organisms are a form of fungi plant life capable of more or less rapid reproduction, using fresh water, oxygen, cellulose and lignin (the latter two constituents being supplied by the timber) in the process.

### Moisture Essential For "Dry" Rot

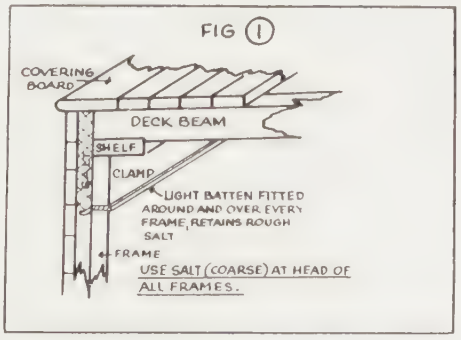
Actually, "dry" rot requires moisture for its development, though the moisture may be carried a considerable distance by the structure of the rotting organism. Gradually the feeding tendrils of the decay fungus spread through the timber, secreting enzymes which dissolve and weaken the cell structure of the wood. This dissolved wood furnishes the food for the development of the wood-rotting organism.

As growth continues, the fungus puts out a crop of minute seeds or spores, often as brightly-coloured 'punk' on the surface of the wood. These spores spread, carried in the air, and can lie dormant indefinitely awaiting warmth and moisture for their development. There are sufficient spores carried in the wind to ensure that wood decay will eventually develop wherever moisture and wood are present.

Science has catalogued hundreds of species of fungi which will attack wood.

At this stage, note that *fresh* water is one of the vital ingredients. Dry rot cannot exist in *salt* water, or sea water of normal salinity.

This has been known to most wooden shipbuilders for a long, long time, and in fact Lloyd's Register of Shipping




Rules and Regulations for the construction and classification of Wood Vessels specified (in 1917) that:

*One year for salting will be added to the term of classification to which a ship may otherwise be entitled, provided that during her construction the openings between the timbers of the frame* (etc., etc.) *be filled with salt* (etc., etc.). See Fig. 1.

### Salt An Enemy Of Dry Rot

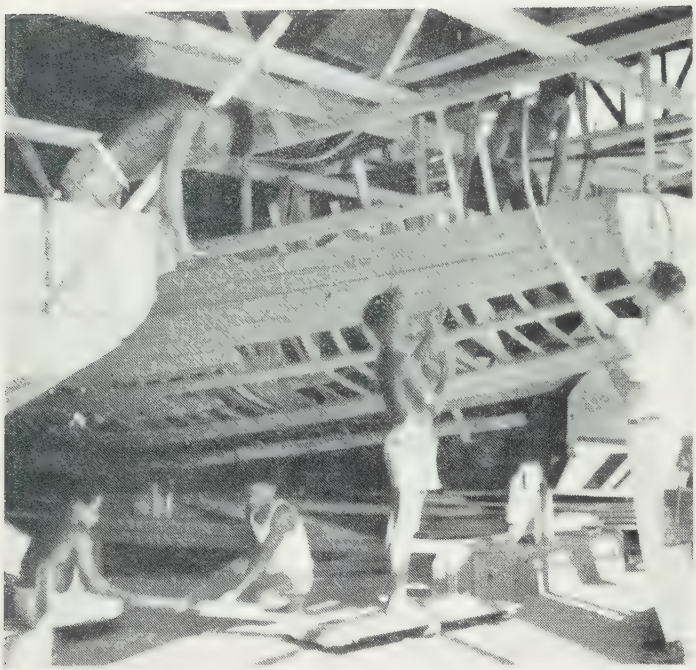
Salt is the enemy of dry rot, and this should never be forgotten by the owner of a wooden boat. Nevertheless, how often does one see the zealously-clean crew or owner washing down his vessel (even on deck) with *fresh* water, and often with the aid of a high-powered hose?

Even although this habit does not always exist, dry rot attack is assisted by the action of rain water which saturates through deck seams, around stanchions, and under covering boards —ultimately "sliming" the ends of the deck beams, tops of clamps and shelves, tops of frames and so on—and from there on the warm, stagnant air provides the rest of the ingredients to breed dry rot, and breed it where it is most difficult to see.

The wooden-ship surveyor spends a great deal of his time tracking down dry rot, and even he can often be misled by a brand new coat of paint or an expert's work with a putty knife. Small chance, then, has the uninitiated, and it is with this in mind that this article has been prepared.

### Prevention Better Than Cure

Prevention is much better than cure, and it is during the construction of a vessel that steps should be taken to stop dry rot. Always bear in mind that most timbers are susceptible to dry rot, although many of the recognised boat-building timbers are chosen by the careful builder because of their ability to



Proper maintenance of wooden ships in the tropics as well as their construction is taught to trainees at the Sideai Roman Catholic Mission school, near Samarai. Here, boats of up to 54 feet in length are built to carry personnel and stores between the widely-scattered Mission stations in Eastern Papua. Right: A large cutter being built in Natewa Bay, Fiji, for local trade. All timber for this hull was pit-sawn from trees felled in the locality.

withstand its attack. Among these are teak (Indian), ironbark, tallow-wood, white beech and Huon pine—all of which have a high natural resistance.

Soft woods in general are more prone to attack because of their porous nature, but this in itself can assist the builder to resist dry rot, if such a timber is liberally coated with copper naphthanate.

Several well-known trade preparations such as 'Cuprinol,' 'Dekol,' all contain copper naphthanate in some form or other.

These solutions, properly applied with a good brush during construction, can play an important part in the defeat of dry rot. Never place or fasten one piece of timber on top of—or to—another, unless it has been painted or treated between 'faces' with copper naphthanate—or failing this—red lead. If this policy is followed most of the dry rot can be avoided. However, other factors come into the picture, the most important one being adequate ventilation.

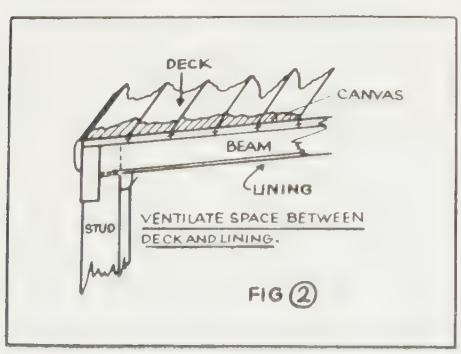



FIG ②

### Good Ventilation

Good ventilation helps to keep a wooden vessel "sweet" and free from condensation. Those little beads of water that appear along the underside of deck beams, clamps, shelves, etc., soon accumulate to form ideal breeding grounds for the dry rot fungi, and once these pockets are left undisturbed by free flowing air or ventilation—particularly in a warm, humid climate—then dry rot is ready to begin.

Ventilation is most important, particularly at the ends of the vessel—stem and stern—behind linings and cupboards, and between the deck head lining and the underside of the deck—if lining is ever used in this way. (Fig. 2.). Even though canvas boat-covers are used, these should never be allowed to seal off natural ventilation, for once this is done condensation occurs, and the invitation is open to dry rot.

### Plywood Prone To Attack

It is sometimes noted that plywood seems prone to dry rot attack—and once attacked succumbs quickly—or at least more quickly than most boat-building timbers. This can perhaps be explained when one recalls that the majority of marine plywoods have a comparatively limited resistance to decay as compared with the tougher types of timber used in the construction of a well-built wooden vessel.

This limiting feature of marine plywood has at last been overcome by a patented process taken out by an Australian manufacturer of marine plywood. In this process every layer of veneer is rot-proofed, so that internal protection is assured as well as all external surfaces. Such a process renders all types of veneer timber immune to dry rot, but it should always be borne in mind that genuine marine plywood should first of all be waterproof, and not merely moisture resistant. Do not confuse delamination of plywood veneers with any form of rot. Delamination occurs because of poor glueing technique, and not necessarily through dry rot.

### Ever-Dry Bilges Undesirable

One sometimes hears of certain craft that rejoice in "ever-dry" bilges. This is not necessarily a good feature, and should be regarded with some caution.

As has already been stated, salt water is a wonderful preservative and a real enemy of dry rot. It therefore follows that some salt water in the bilges is a good thing. This is sometimes achieved by allowing sea water to drip through the inside packing gland of the stern tube.

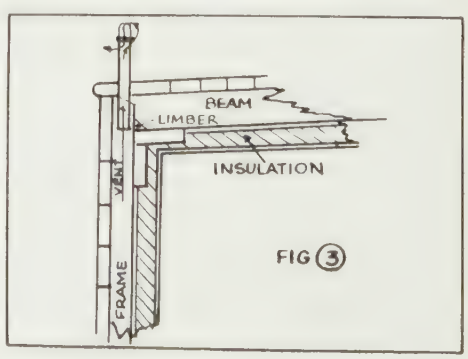



FIG ③

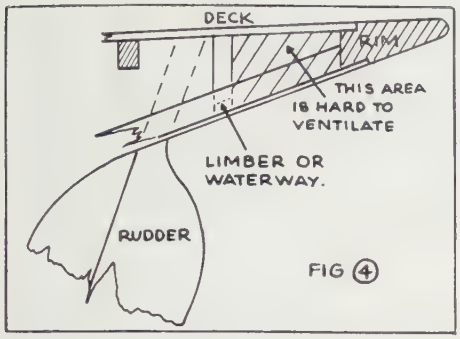


FIG ④

### Other Danger Points

Other danger points in a wooden vessel are the toilet, shower room, and any refrigeration space. Taking the first two items, it should always be remembered that soapy fresh water and leaky toilets cause much dry rot unless every care has been taken in the fabrication and installation of both. It is usual to provide a lead tray right throughout the "floor" of the toilet and wash rooms with turned-up sides approximately six inches high. The side walls of these compartments then lap down and over the lead, and form a waterproof shield to the deck under the lead.

In theory this is good practice and is usually insisted upon. There is however, a real danger in adopting it, for once the smallest crack appears in the protective lead floor-covering, foul fresh water can lie between the lead and the wooden deck, and in no time dry rot begins to flourish. As a preventative, always set the lead floor-covering down in copper napthanate, creosote, or any proven preserving oil, and always flush out these quarters with salt water.

Refrigerators and ice boxes, particularly the latter, often add to the dry-rot hazard unless carefully ventilated. In this case the condensed fresh water and or scupper-pipe drainage should always be led overboard or down low into the bilge water by means of a suitable pipe or hose. Do not lead such water down through the flooring or lining, and allow it to seep away at will. This will surely result in dry rot.

In the case of freezing chambers or refrigerated spaces, every care should be taken to ventilate the space between the insulation lining and the inside of the vessel's hull. Always use good seasoned timber as lining, and freely use a suitable preserving medium when fitting the lining to the faces of the frames.

The air spaces between each frame should be so arranged that air can flow freely from the bilge to the air course at the deck head, and these air courses should be led to the atmosphere by means of suitable small ventilators, usually called swan-neck ventilators. (Fig. 3.).

While all this certainly means more work and costlier construction in preventing dry rot it pays off in the long run.

Reverting to an earlier reference to the ends of the vessel—the author recalls several instances of serious dry rot in counter-sterned island vessels, and would point out that such vessels are particularly prone to dry rot unless carefully ventilated and fitted with adequate limbers. (Fig. 4.).

The construction of a counter stern precludes inspection, and unless rain water is kept out of the stern, trouble is bound to occur. Coarse salt is one way to keep such areas free from rot.

The bow section or stem is also open to attack for the same reason, particularly if the area forward of the forward bulkhead is not open for frequent inspection and ventilation. The end grain of the stem and apron invites the entry of seeping rain water, and unless reasonable ventilation is provided, trouble can be expected from this quarter.

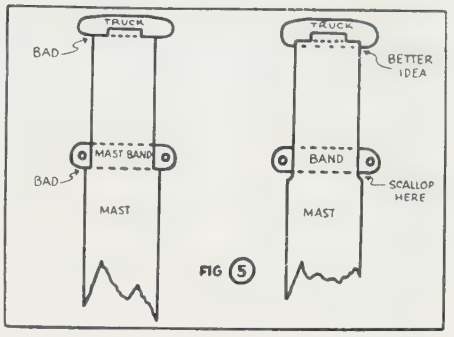


FIG ⑤

### Other Vulnerable Spots

Several other vulnerable spots deserve particular mention—and these are at the "hounds," at and behind mast bands, under mast trucks and around the wedgings, and under the canvas collars which are supposed to protect the mast where it goes through the deck.

Each and every one of these points can produce ideal spots for the breeding of dry rot and all because they provide ready lodgment for fresh rain water. Once again, red lead or a good preserving oil should be used before the boatbuilder completes the installation of each unit.

The mast bands should always be driven down on to a scalloped shoulder —never on to a squared shoulder. (Fig. 5.). In the case of a scalloped shoulder, rain water can drain away from the end grain, whereas in the case of a squared shoulder, the end grain, so carefully squared to take the bottom of the band, invites seepage into the mast.

By the same token, the mast truck should always be regarded as a "hat" covering, protecting the top end grain of the mast, and not just an ornament through which occasionally runs a halyard.

# FAO WORLD SURVEY OF COPRA SITUATION

A RECENT survey* of international copra production and trade by the Food and Agriculture Organization of the United Nations states that the world copra output for 1959 is expected to be about the same as the total production in 1958, when 2,881,000 metric tons were produced. A fairly substantial increase in 1960 is predicted, mainly as a result of the recovery of production in the Philippines and good crop forecasts in Ceylon and most Pacific areas.

The eighteen months of poor rainfall in the Philippines up to mid-1958 has been a dominant influence in world copra production trends and market prices for the past two years. World production, which had increased from an annual average rate of 2,600,000 metric tons in 1948/52 to 3,430,000 tons in 1956, fell to less than 2,900,000 metric tons in 1958. Philippines production, which totalled 1,335,000 metric tons in 1957, fell by 270,000 tons in 1958 and an estimated 335,000 metric tons last year.

With an assured prospect of a fairly sustained reduction in copra and coconut oil supplies on world markets, international prices for these commodities rose during 1958 to levels quite outside their usual market relationship with other edible or soap fats and oils. In manufacturing countries, technical substitution of other oils for coconut oil was undertaken gradually, and with apparent reluctance, and consequently copra prices in 1959 increased to the highest levels operating since the Korean war boom levels of 1951.

In view of the ample supplies of other fats and oils available at present and forecast for 1960 as well as the prospect for larger copra supplies in the months ahead, the FAO market survey concludes that, in 1960, copra prices may be expected to move downwards again to levels ruling in 1957 before the shortage developed.—V. D. STACE.

* Published in the November 1959 issue of *Coconut Situation*, a special bulletin prepared semi-annually by the Fats and Oils Section, Commodity Division, FAO Headquarters, Rome.

## Training Course For Foresters

Papuans and New Guineans are being trained as field workers by the Department of Forestry in the territory. A three-month training course is provided for trainees sent from districts interested in forestry development but which do not have forestry stations. On their return home they will establish and care for forest nurseries, supervise the transplanting of seedlings to field plots, and work with their own people in maintaining small forest plantings.

Suva waterfront, with the Grand Pacific Hotel in the foreground. Built over half a century ago, this famous hotel is now being extended and modernized to cater for the steadily-growing influx of visitors from overseas.

# Tourism: Fiji's New Million-Pound Industry

*The revenue from Fiji's tourist industry, which last year was just on one million pounds, is this year confidently expected to exceed this figure. This article describes latest developments in this rapidly-expanding industry, which is being actively fostered by the Government.*

By GEORGE BEZAR

THE expansion of Fiji's tourist industry in the past few years has been speedy and sustained. Last year the revenue it produced was only just short of the £1 million mark. This firmly establishes it in the position of Fiji's fourth industry, with only sugar, copra and gold surpassing it.

The Colony's staple industry, sugar, produces nearly £8 million a year; copra over £2½ million and gold £1,100,000.

### More Accommodation Being Provided

The big handicap to the industry has been the shortage of hotel accommodation, which has resulted in tourists having to be turned away. Construction of new hotels and the expansion of existing ones is helping to remedy this situation.

The luxury type air-conditioned new Club Hotel in the centre of Suva, with its 17 bedrooms, which was opened in December 1958, met an immediate demand, particularly from wealthy American tourists who regard air-conditioning and up-to-the-minute plumbing as "musts" for their vacation. The demand for this type of accommodation is so great that within less than a year of its opening, the hotel has had to be enlarged. Five additional bedrooms and an extension of the dining room are now under construction.

The stately Grand Pacific Hotel, which was built over half a century ago, is being modernised. Its existing 43 bedrooms are being supplemented by a new wing, containing 36 double bedrooms with air-conditioning and private bathrooms and balconies.

The cuisine of this hotel has also been changed to modern menus with the addition of exotic Chinese dishes. Facilities for swimming near Suva are limited, and the hotel is providing an open-air swimming pool beside the lawns on the edge of the sea.

The famed Korolevu Beach Hotel is noted for its quaint native-type thatched bures (huts) equipped with modern conveniences. This hotel has recently been enlarged by the construction of additional bures.

New hotels are being built by the owners of the Grand Pacific-Cathay Hotels (Fiji) Ltd. Two of them will be at the other end of the main island of Viti Levu—one at Saweni beach and the other in the town of Lautoka, a busy seaport only 20 miles distant from Nadi Airport.

In Suva, too, there will be an additional hotel (Hotel Suva) in Waimanu Road.

### Nadi International Jet Airport

As essential as hotels to the success of Fiji's tourist industry are the means of transport to the Colony. A giant stride forward in this respect was accomplished with the completion of the £4½ million extensions to Nadi Airport, to equip it to cope with the giant jet airliners. The extensions were opened by the Governor, Sir Kenneth Maddocks, on February 17.

Nadi Airport is a monument to the initiative, enterprise, co-operation and faith of the member governments of the South Pacific Air Transport Council—Australia, New Zealand, the United Kingdom, Canada and Fiji.

This modern jet-age international airport saw its birth in the early 1930's as a grass strip hurriedly prepared on level land near the edge of the sea to provide landing facilities for pioneer trans-Pacific fliers Charles Ulm, George Littlejohn and Leon Skilling. They never made use of the strip because they were all killed when their plane crashed into the sea. (Earlier, Kingsford Smith and Charles Ulm in the famous Southern Cross made a landing in Fiji in June 1928, but that was on Albert Park, Suva, at the other end of the main island of Viti Levu).

From that small grass strip at Nadi developed the jet airport opened on February 17. Close to the site of that old strip was laid, in 1940-41, the first big runway at the airport—a gravel

**Above: An open-air lunch of tasty Fijian dishes is provided for tourists at the Beachcomber Hotel at Deuba, 30 miles from Suva by road. Right: Fijians performing a spectacular spear and fan dance for the entertainment of tourists, in the Botanical Gardens at Suva.**

stretch 5,000 yards long. It was built by Number Two Construction Unit of the Royal New Zealand Air Force. Later, after Pearl Harbour, the American Forces came in and greatly extended the airfield.

From these wartime activities it grew, in the post-war period, into an airport for the use of international aircraft.

With the advent of the jet age came the need for an airport big enough to cope with the new giant airliners. With commendable foresight the authorities started planning seven years ago for this development. Now, as a result of that long-range planning and the united efforts of surveyors, architects, engineers, contractors and workmen, the new airport is in full operation.

The vast new runways which have transformed the airport so that it can take the huge new aircraft of the jet age have cost about £4 million, which has been paid by the South Pacific Air Transport Council.

Fiji's share has been the construction of the new terminal building, the estimated cost of which is £310,000.

The fact that jet aircraft are almost halving the time taken to reach Fiji, especially from Australia and the United States, is resulting in a marked increase in the number of tourists to Fiji. Hotels and travel agencies report more bookings than ever for the coming tourist season, and in spite of the expansion of hotel accommodation there are periods in the months ahead when many hotels are already completely booked out.

### More Visitors Arriving By Sea

In line with the increase in air travellers, more and more staying visitors are arriving by sea. The Orient Line plan for tourists to come into Fiji on one ship, stay for a few days, and leave on another of its ships, has proved extremely popular. This enables tourists to spend a few days in the Colony, instead of only one.

More cruise ships, too, are visiting Fiji. Their usual stay is for two or three days.

The Hibiscus Festival, which originated as a two-day event, now covers

*(continued on page 74)*

**Below: The well-known Korolevu Beach Hotel at Sigatoka, and the landing strip. This is the first hotel in the South Pacific to have its own aerial transport service. It is also noted for its quaint but well-equipped Fijian thatched bures (right), which guests find are cool and comfortable.**

Above: The prototype of the copra drier described below was built at the Tagabe experiment station of the Department of Agriculture, New Hebrides. Right: Firebox with hinged door to regulate the flow of hot air in the flue.

# The Tagabe Hot-Air Copra Drier

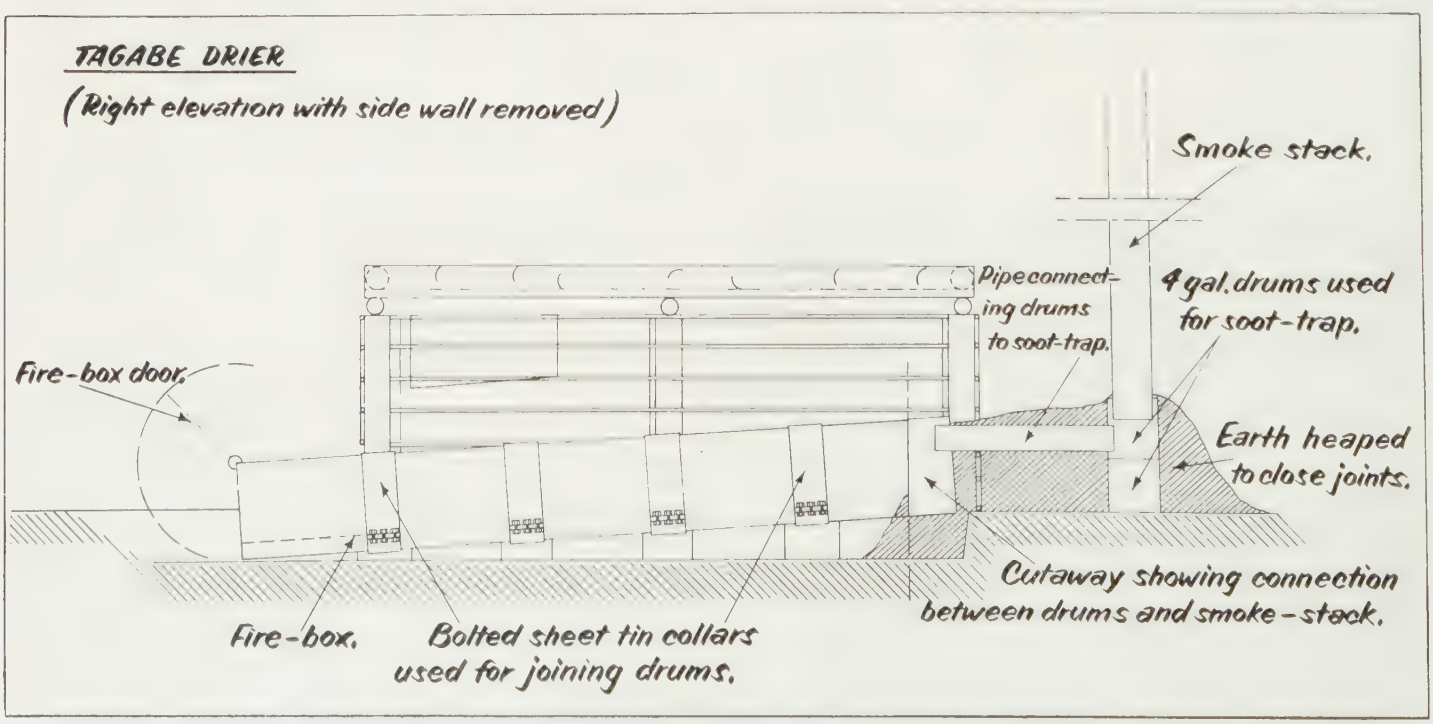
*With a view to improving the quality of New Hebrides copra, the Department of Agriculture of the Condominium has devised a simple, low-cost, hot-air drier on the lines of the Kukum drier widely used in the British Solomon Islands.*

By H. LE GALL and P. DERCLE*

THE well-known coconut authority W. V. D. Pieris, writing in *The Manufacture Of Copra In The Pacific Islands*[1], states:

"The most unsatisfactory smoke-driers are to be found in the New Hebrides and Fiji where, for various reasons, the production of clean, well-dried copra has not hitherto been regarded as worth while. The structures themselves, with a few exceptions, are ram-

* Department of Agriculture, Condominium of the New Hebrides.


TAGABE DRIER
(Right elevation with side wall removed)
Smoke stack.
Pipe connecting drums to soot-trap.
4 gal. drums used for soot-trap.
Fire-box door.
Earth heaped to close joints.
Cutaway showing connection between drums and smoke-stack.
Fire-box.
Bolted sheet tin collars used for joining drums.

shackle and so designed as to bring a maximum amount of smoke in contact with the copra . . . and the quality of copra is, inevitably, very bad indeed".

At present, in many Pacific territories and elsewhere, the possibilities are being studied of standardizing the quality of copra. In the near future, it could very well be that copra failing to conform to established standards will be most difficult to sell on world markets.

As a result, the Department of Agriculture in the New Hebrides has considered it necessary to devise efficient methods of copra processing.

### Modified "Kukum" For Smallholders

For smallholders, the Department has evolved a model similar to the "Kukum" hot-air copra drier developed by the Department of Agriculture in Honiara.

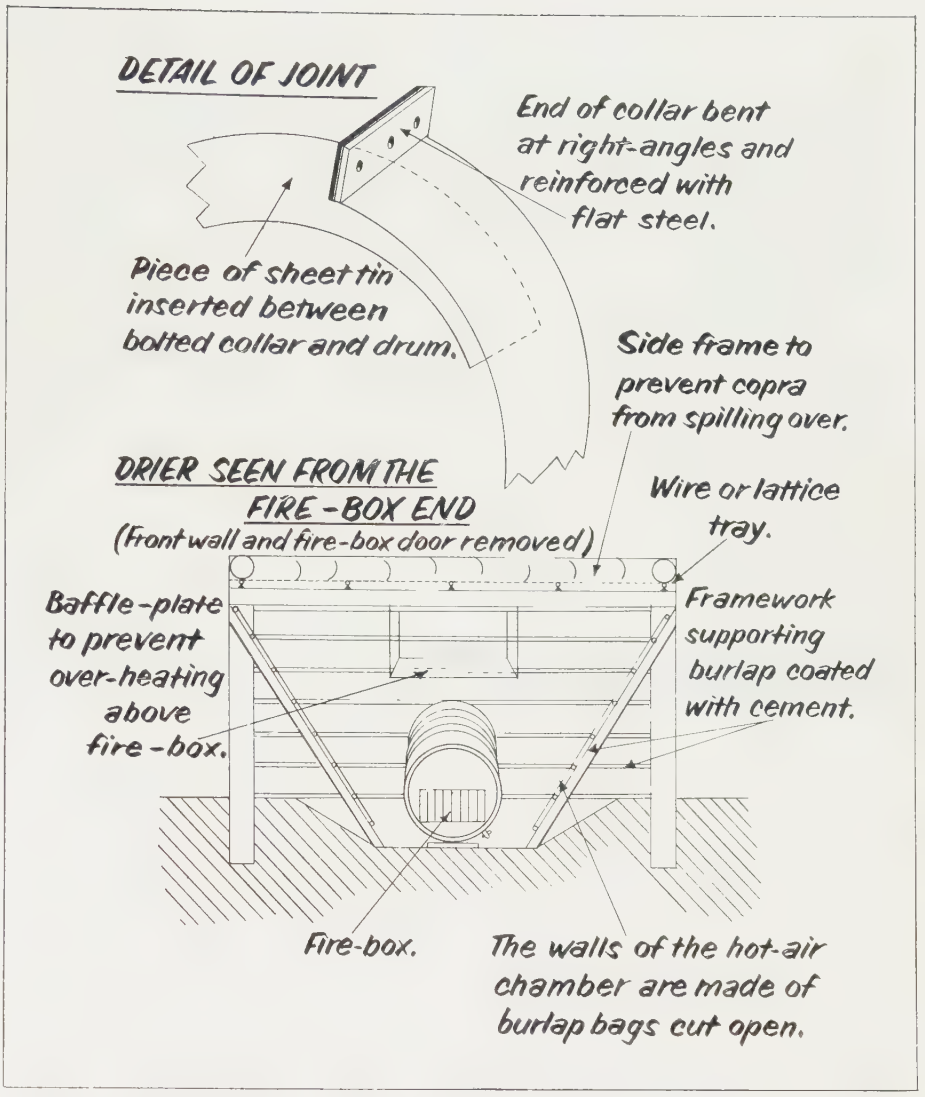
BUILDING REQUIREMENTS: The drier should be built on high ground in order to ensure that in rainy weather the firebox will not be flooded. It should be protected by a shed roofed with coconut fronds or other local or imported materials (corrugated iron, cement-dipped sacks, etc.). The minimum dimensions of this shed must be 26′ x 16′, though it could be larger to allow for storing the dried copra. Within these limits, a trench 18′ 6″ x 6′ 6″ x 10″ should be dug, the depth being increased if the ground permits. It would then be possible to lower the mesh drying platform, enabling easier handling of the product.

HEATING EQUIPMENT: Take five 44-gallon oil drums, each without top or bottom except the last, to which the smoke stack will be fitted. The drums should be joined together tightly, for copra deteriorates in contact with smoke. Use 6″ to 8″ wide sheet steel collars bent at right angles at their ends, and bolted with reinforcing flat strips of steel (see diagrams).

The oil fumes produced by combustion form with the sand covering the drums a cement-like composition which seals the joints. (To ensure this result we heated the uncharged drier for ten hours). To increase the draught we gave the flue a 6° slope.

DRYING PLATFORM: The drying platform is made of wire mesh, bamboo slats, or other suitable material, laid over the heating chamber approximately 5′ above the flue.

The materials used for constructing the heating chamber are those recommended for the Kukum drier, and they proved most adequate. Copra sacks, cut open and cement-dipped, are suspended over a wooden frame. This type of sack is fireproof and can be placed near the firebox.


DETAIL OF JOINT
End of collar bent at right-angles and reinforced with flat steel.
Piece of sheet tin inserted between bolted collar and drum.
Side frame to prevent copra from spilling over.
DRIER SEEN FROM THE FIRE-BOX END
(Front wall and fire-box door removed)
Wire or lattice tray.
Baffle-plate to prevent over-heating above fire-box.
Framework supporting burlap coated with cement.
Fire-box.
The walls of the hot-air chamber are made of burlap bags cut open.

The first drum is entirely covered with sand to avoid overheating of the front part of the drying platform. A baffle plate is placed about 1′ 6″ over the first trials. The fire grate is made with landing strip matting, or simply with strips of iron.

The junction between the end drum and the chimney stack is a pipe connected to a soot box built with concrete blocks and mortar. Alternatively, a four-gallon drum can be used as soot box. On this drum is fitted the chimney.

Improvements made to the Kukum drier include:

(i) An increase in the diameter of the chimney to 10″. This width and a length of 19′ 6″ guarantee sufficient draught and regular heating. Only coconut husks and shells are burnt, saving wood, which is costly.

(ii) An improved method for sealing the drums together (see section headed *Heating Equipment*).

(iii) Addition of a door at the front of the firebox which can be closed to regulate the flow of hot air in the flue. This door can be made from the bottom of a drum attached to the top of the firebox (see photograph). It can be opened or closed with an iron rod.

(iv) The walls have been brought nearer the flue to facilitate even distribution of hot air under the product being dried.

(v) The shed has been closed in with old sacks to a certain height (see photograph). In the upper part of the ends an opening has been left, insuring a better outlet for damp air.

### Conclusion

This drier can be built for approximately £14. It is likely to interest small family concerns, for it can dry between 650 and 900 pounds of green copra in 48 hours. Yield is about 60% copra instead of 50% from smoke-driers.

[1] SPC Technical Paper No. 82, published in July 1955.

# Native Local Government Councils In Papua And New Guinea

A member of the Vunadadir Local Government Council presenting a case for a community project at one of the regular Council meetings. An officer of the Administration is present in an advisory capacity, and is engaged full time as adviser to local government councils in the Rabaul area.

*The important part that the native local government council system is playing in the development of Papua and New Guinea is explained in the following article.*

By H. T. PLANT*

IN December 1949 an Ordinance known as the *Native Village Councils Ordinance* came into effect and gave the Administrator of the territory of Papua and New Guinea power to establish Native Village Councils at any place he might appoint. In November 1954 the Ordinance had its title changed to *Native Local Government Councils Ordinance*, and councils established under it became known as Native Local Government Councils.

Before the last War, the two territories of Papua and New Guinea were administered separately, and a somewhat different arrangement existed in each for the administration of the native peoples, although both had a system which employed the use of what came to be known as "village officials." These systems continued to operate after the War, even though the two territories came to be administered by a single Administration.

In the territory of New Guinea, the first step of the German native Administration policy was to appoint one of the village elders as Headman or Luluai, and to endow him with a few minor legal powers. This newly-acquired authority, however, only partially compensated for the gradual decline of the elders' prestige which resulted from the progress of the general culture contact situation. The Australian Administration continued that system, and endeavoured to foster a series of more centralised native authorities, by appointing Paramount Luluais with vague jurisdiction over tribal areas.

Generally, the Paramounts were not successful. Lacking any special statutory authority, and for the most part without

* Executive Officer (Local Government), Department of Native Affairs, Administration of Papua and New Guinea.

Below: A school in the Rabaul area of New Britain, erected by a Local Government Council from its tax revenue. Trained teaching staff, text books and other school equipment are provided by the Department of Education, and the school work comes under the general supervision of the District Education Officer. Right: A Medical Aid Post built by the Rabaul Local Government Council for residents of Pila Pila village. The Council also pays the salaries of the indigenous medical staff. Supervision of the Aid Post is carried out by the Health Department of the Administration, which also supplies general medical stores and drugs.

**Above: Village women drawing water from a cement well at Pila Pila, near Rabaul. This well was sunk by the Local Government Council to ensure a pure water supply for the village. Previously, water had to be carried a considerable distance from streams which could not be fully protected against pollution. Right: Local Government Councils are assisting in the compilation of vital statistics. Here two taxpayers watch a clerk make an entry in the Council's Register of Marriages.**

any hereditary status, whatever power they possessed emanated from the strength of their own personalities and the backing they received from individual Administration officers. A second pre-war method was the establishment of unofficial village councils, or "kivungs". The first of these was established in 1936, and they were particularly centralised in the Rabaul area. These organisations, each of which covered several village groups, were not granted any legal powers. They acted only as advisory bodies to the village officials and Administration officers, and in practice were little more than debating societies.

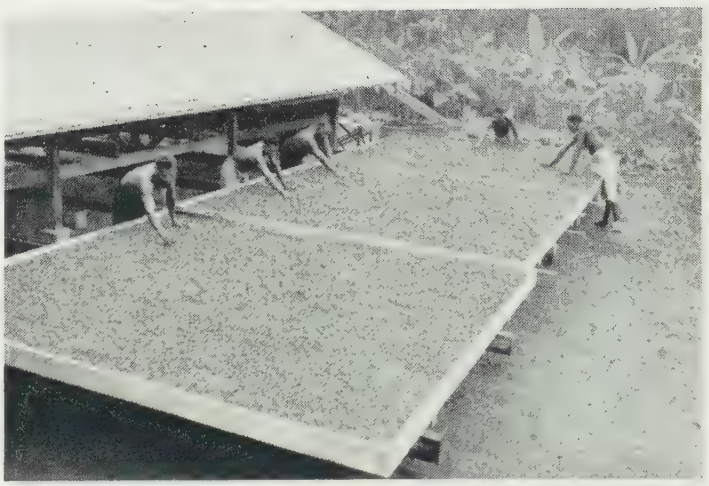
In the territory of Papua, Village Councillors and Village Constables had been appointed. The Councillors were nominated by the people themselves, and the Constables were selected by the Administration. They, like the "village officials" in New Guinea, never provided a successful system of local government, because they too lacked any special statutory authority. In some instances groups of councillors acted as advisory bodies, but again without any legal powers.

At the time of the introduction of native local government councils to Papua and New Guinea, the existing village official systems could no longer be regarded as constituting an appropriate medium for any enhanced tempo of native administration. There were clear indications that there was a need to bring our native administration system into gear with actualities. It appeared essential to have a re-definition of village leadership by building up administrative combinations of villages on an area basis.

### Village To Area Administration

Essentially, the native local government system involves a change-over from single village administration to area administration, using tribal areas or combinations of tribal areas as the administrative unit wherever possible, and simultaneously training elected members to carry out various functions in accordance with the legislation provided. The idea was new to Papua and New Guinea when first introduced, but had been used for many years, with some success, in certain British dependencies and in more recent times had been adopted by other Administra-

**Many Councils have established markets. This shows the market at Rabaul which operated before the Councils were established in that area. It has been taken over by the Rabaul Council but the other Tolai Councils contribute towards the cost of cleaning and maintenance.**



Above: A lesson in animal husbandry being given at a boarding school built by the Vunamami Council and staffed by the Department of Education. Right: The five Tolai Councils in the Gazelle Peninsula of New Britain operate sixteen central cocoa fermentaries. This is a simple type of sun drier at one fermentary, each of which can handle the output of 50,000 trees. The equipment of each also includes fermenting boxes and a hot-air drier.

tions. Hence, in applying it to Papua and New Guinea we were not breaking new ground.

In Papua and New Guinea the conditions of terrain, population distribution and native social organisation were not favourable to the growth of large native political units in pre-European times. An extremely broken terrain with a sparse population comprises some two-thirds of the country and resulted in marked political fragmentation, with a pattern of many small mutually independent, hostile village groups and a bewildering number of dialects. The problem has been to fit the people, whose culture, values and institutions markedly differ from our own, into our system of government, so that they can assume an increasing responsibility for the management of their own affairs and learn to understand that, in the long run, they must be able to contribute to the cost of the social services they enjoy.

### Basic Aims Of Native Local Government Policy

The basic aims of the Native Local Government policy have been formulated as:

(a) To provide a medium for teaching natives to assume a measure of responsibility for their local affairs in accordance with democratic procedures;

(b) to provide area machinery and local funds for extending and co-ordinating social and public services at village level and hence to enlist native support in endeavours to raise native living standards;

(c) to face the native population squarely with the fact that progress is inseparable from good order and industrious habits and that social services have to be paid for;

(d) to prepare the way for ultimately fitting the native people in a way they can understand into the territory's political system.

Native Local Government bodies established under the Ordinance have the following characteristics:

(a) All Councils are area Councils. Each covers a number of villages whose people have agreed to be incorporated within that particular Council. The size of each unit is based on topographical factors and the existence of common interests. Because these bodies have definite financial functions there are minimum population groupings beneath which the system is not workable. Apart from the fact that small villages acting independently do not have financial resources to contribute substantially to their own advancement, they have neither the skills nor manpower. Another factor which may not be so obvious is that, bearing in mind the generally low level of native executive and financial competence, a system involving close guidance by Administrative officers of scores of tiny village treasuries is not administratively feasible. It has been found that the native people themselves soon learn to appreciate the advantages accruing from pooling of resources on an area basis.

(b) Each Council is composed of elected members as specified in the proclamation establishing the Council. The method of election is either by open or secret ballot, depending on the degree of literacy of the voters. Representation is determined by the conditions existing in each particular area, and is worked out in accordance with the wishes of the people themselves.

(c) A Council thus constituted is a *body corporate*.

(d) The Council's functions fall into three main headings, the first of which is obligatory and the others permissive:

(i) Maintaining law and order;

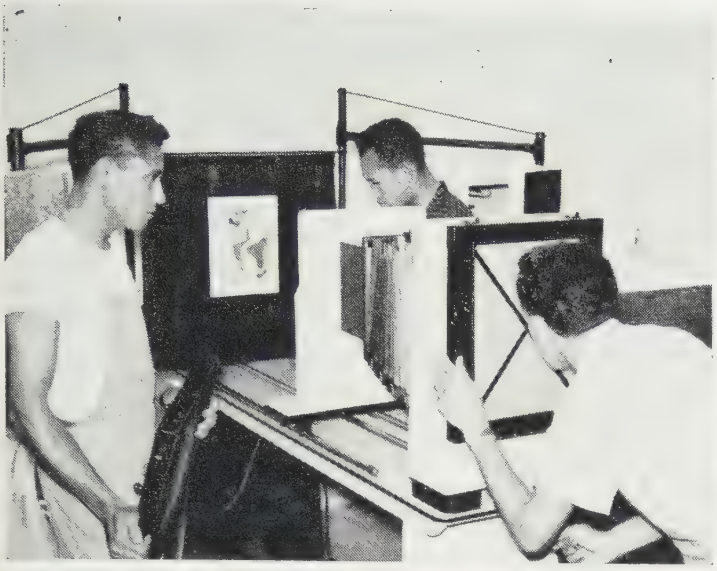
(ii) sharing responsibility, including financial, with Government Departments for social and public services within their areas, and providing, so far as their finances allow, any additional services which are required for the benefit of the community;

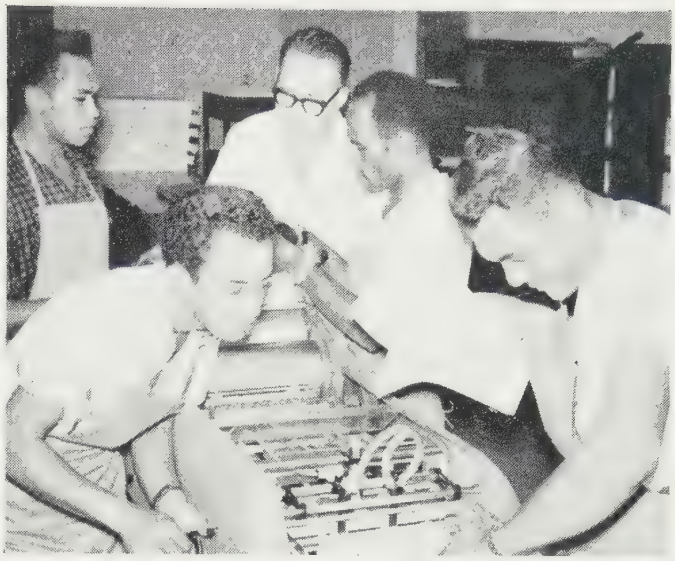
(iii) making rules on matters concerned with the peace, order and welfare of the native community in their areas. These rules, when approved in the manner laid down by the legislation, have the force of law and breaches of them are tried in the ordinary courts.

(e) Councils are financed by local rates set by the Councils themselves. These tax monies are collected by the Council and disbursed in accordance with approved estimates prepared by the Councils, usually in consultation with an Administration officer.

As previously mentioned, the Ordinance governing the establishment of these Councils was passed in 1949, and the first Councils were established in 1950. At that time it was decided that the Gazelle Peninsula would be used as the main testing ground for the policy, and it was there that the main expansion

*(continued on page 50)*





**Above: Three of the twelve students taking the first one-year course at the Centre, working on the process camera. (L. to R.): Fagamanu Pemerika, Western Samoa; Kasiano Tio, Fiji; and Tereoroa Ariki, Cook Islands. Right: Preparing to run off a job on the offset printing machine. (L. to R.): Joseph Samuela, Cook Islands; Liu Iosefa, Western Samoa; Mr. A. M. Koenen, technical production officer; Ranu Nihara, Papua and New Guinea; and Kasiano Tio, Fiji.**

# Literature Production For The Islands

*The Literature Production Training Centre established by the Commission in Honiara recently was not set up merely to train islanders as printers; its basic purpose is much wider, as the author of this article explains.*

By BRUCE ROBERTS*

THE chief purpose of the Literature Production Training Centre is to train people from the Pacific islands to prepare and print the kind of publications they specially need in their own education programmes.

By education I mean education in its widest sense, i.e., not only in schools but also in connexion with adult education, literacy work, agricultural extension work, health education and so on. And as regards publications we include school books, news sheets, leaflets for extension workers, 'how-to-do-it' books for adults, and even books for leisure reading.

The Centre has been equipped with its own printery, and the machinery installed there has been selected with careful regard to the special problems found in the islands. The Centre provides a one-year course for twelve trainees at a time, and there will be three such courses—one this year, one in 1961, and one in 1962.

At this year's course there are two trainees from the Cook Islands, two from Western Samoa, one from Fiji, three from Papua and New Guinea, two from the British Solomon Islands, and two from the United States Trust Territory of the Pacific Islands.

### Significance Of The Centre

So much for the facts. What is the significance of this Centre and why did we set it up?

There are thousands of islands in the Pacific, and in all of them some of the old ways of life are changing for new things. For example, people want better health. Now this is not just a question of more doctors; it means more knowledge about how to avoid disease; it means better housing; it often involves better nutrition, which in turn means growing new kinds of crops and learning new ways of preparing food.

Then again, people quite rightly do want more of the material things of this world. This may be only a guitar or it may be a motor car. But on an everyday level people like to own a radio; they want something better than a few burning logs of wood or hot stones to cook with; they want a constant water supply instead of having to fetch it in buckets from a distant well. And they want better lighting in their homes. These are just a few things that people have every right to aspire to.

But it takes money and new kinds of knowledge and new ways of living to make these things possible. Even a desire for only a few new things can bring about profound changes in people's way of life. As the greatest of books says, "you cannot put new wine into old bottles".

Now, all this means that there is a constant need for more knowledge. No one can start useful action to achieve something unless he has a good idea of how to start, what to do, and where his actions are likely to lead him. This is true in every aspect of life, whether it be agriculture, health, economics or changing relationships with one's fellow man.

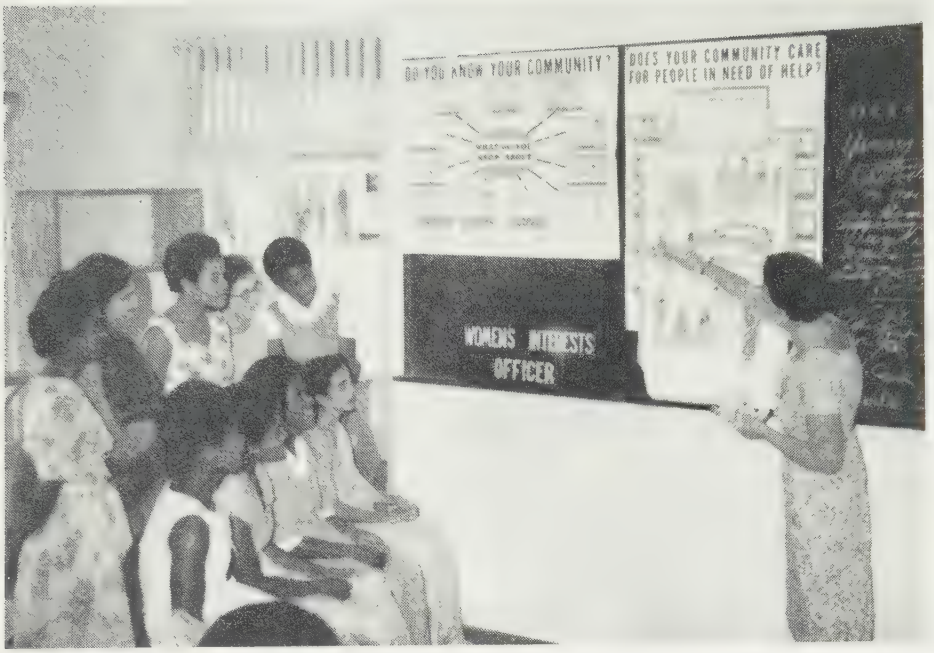
There are many different ways in which people can get new knowledge, and the printed word is among the most important of them. In any developed country like Australia or England or France we have books, libraries, periodicals where we can find out all sorts of things. And our ministries of agriculture and health and so on publish many, many books, pamphlets, leaflets giving all sorts of useful information.

In many Pacific islands this kind of thing is only just starting, and there are a number of special difficulties in the way of developing it. One difficulty is that the needs of various islands are different from each other. People dress differently, live differently, have different

*(continued on page 50)*

* Mr. Roberts was responsible for the setting up of the Centre in his capacity as Director of the Commission's Literature Bureau, which was established in 1952 to stimulate the supply of urgently-needed reading material for the islands. The accompanying article was given as a broadcast talk to Pacific listeners by Mr. Roberts shortly after the Centre was opened last March.—Editor

# Training Women For Leadership In Fiji




*Since March, leadership courses in women's club work have been conducted in Fiji by Miss Ruth Robertson, women's interests officer for the Colony, and the SPC women's interests officer, who has contributed this account of their work.*

By MARJORIE STEWART

**Miss Robertson demonstrating a flannelgraph to a few members of the group who attended Leadership Training Day, held at Suva on April 30.**

THERE is no doubt about the increasing interest that Fijian and Indian women are taking in the affairs of their community. During the four weeks from mid-March to Easter, leadership courses in women's club work have been taking place on six successive days per week—Mondays at Sigatoka, Tuesdays at Nadi, Wednesdays at Lautoka, Thursdays at Ba, and Fridays and Saturdays (for two weeks) at Vatukoula. About 204 women in all have attended at the different centres, representative of the Fijian, Indian, Rotuman, part-European and European communities.

The instruction is worked out in dialogue form and is given by Miss Ruth Robertson, women's interests officer for Fiji, and the author, while nutrition and cooking sessions are planned by the Nutrition Section of the South Pacific Health Service and executed by their staff and our Fijian assistant, Pulotu Enesi. In support of a protein campaign, talks are given on poultry-keeping at some centres, while at others, following on a hygiene lesson, the Health Officer gives a practical health programme for a village.

The first day of the four-day course begins with "The Woman in Her Home and Village", and a typical, comprehensive club programme is worked out related to her daily needs. Later sessions deal with methods for starting and running a club, how to encourage thrift, and how to use visual aids and drama as a way of teaching. Finally, on the fourth day there is a session on the future outcome of the course in each neighbourhood.

Practical sessions are held in the afternoon on food values, food hygiene and cooking, as well as in sewing and patchwork. Sample garments are displayed and a variety of patterns are available for copying. In order to encourage leaders in their efforts to establish a good teaching programme in their clubs, each is supplied with a kit which embodies the teaching of the course—leaflets on club method, balanced diet, recipes, patchwork, games, songs, sanitation. On sale are recipe books, infant feeding books, a handbook on women's clubs, as well as outline drawings for making flannelgraphs. Much of the kit is available in Fijian, Hindi and English.

Some of those attending the courses represent several already well-established organisations such as Church groups, Soqosoqo Vakamarama, Girl Guides, Red Cross, while teachers and nurses attend to a varying extent. Where there are no active women's groups it is hoped that one will be started, and that there will be an interchange of visits in each area between different groups, with perhaps an occasional "get-together".

### A Typical Day

Near Tavua we meet at the estate of the Vatukoula Gold Mine, where our audience consists entirely of Fijian and Rotuman women from the mine workers' settlement.

After breakfast we set out along a quiet country road through green pastures fringed with smooth and then jagged hills to the grounds of the Gold Mine. We drive through Fijian and Rotuman villages, past two Co-operative stores, and up a steep hill to the recreation room.

Eager helpers unpack our varied teaching aids plus the cumbersome kit for cookery and food demonstrations, or all the paraphernalia for dressmaking. Three instructors tumble from the Morris Minor, three large flannelgraph boards wrapped in tarpaulin are hauled down from the roof, the first lesson is assembled, the women trickle in and singing begins—single verse songs or rounds, easily translatable, the group assimilating the tune at the second hearing, though with occasional startling variations which if not immediately nipped become ineradicable.

The morning sessions are calculated to evoke thought and discussion and to promote "audience participation", all by means of minimum talk and maximum illustration. "Suppose you were to have a women's club in the village, what kind of programme might you plan?"—the Fijian interpretation is heard in non-committal silence.

A flannelgraph depicting a buxom Fijian housewife and her thriving family is displayed—"What are her jobs around the house?"—"Cooking . . . sewing . . . washing . . ." each answer is confirmed by the appropriate local illustration, the group relaxes, we plunge into deeper levels of women's obligations in Home and Family and Community.

Flash cards tell the sad story of Itch or Roundworm or Malnutrition.

The second session deals with aspects of village improvement of a sanitary, nutritional or pediatric nature. A Government health or agricultural officer

Above: Women leaders who attended the Course held at the Levuka Craft Centre on Ovalau Island during April. Right: Members planning to act a scene depicting the good and bad home.

takes the floor, or the company divides into smaller groups to discuss their views regarding women's responsibility and opportunity. Most of the teaching has to be conducted in at least two languages. Visual aids assist the interpreters.

After a break for a picnic lunch the afternoon is given over to practical demonstrations of cooking and food values, or needlework and patchwork, followed by a closing thirty minutes of games.

### Dramatic Presentation Of Lessons

In the Ba Course one group of seven undertook to demonstrate a nutrition lesson. A Fijian, an Indian and a European woman staggered in and flopped down on a bench, too tired to cook, only able to stop their pangs of hunger by stuffing down dry, white bread—breakfast, dinner and tea were nothing but bread and cassava. Then three other women bustled in for breakfast, a balanced and delectable repast. Off they went to a superb start and achieved a phenomenal morning's work. Dinner was equally effective, as was tea, and by night they were still irrepressible.

In Sigatoka a group presented a shocking scene from a deplorable home—drunken mother, clamouring, diseased children, bad-tempered father — all starving and living in the utmost poverty. They were swept aside by a Model Family of one dozen children suitably employed in various lucrative professions and most adequately fed, bustling through their day's profitable programme, while an earnest "son" of the house in precarious long pants and vast, flapping shirt, methodically drove his oxen over the family holding (a mat) and sowed his seed.

At each Centre, a dramatic presentation was also given of how to run a Village Women's Club, newly-fledged chairmen briskly handling the customary agenda.

To meet enthusiastically for a four-day training course is easier than settling to regular weekly or monthly meetings of a local club—whether long-established or new.

### Follow-Up Groups Formed

As a follow-up to the course in each centre, a small, multi-racial group chosen from among those attending has undertaken to meet and plan a continuous programme for stimulating and assisting any groups starting in their area. Potential leaders are recommended to contact this local committee as well as to keep in touch with the women's interests officer of Fiji for advice and further lesson material.

Four- or five-day leadership courses similar to those described are to take place at Levuka in April, Savu Savu and Labasa in May, and Kadavu in June.

# SPC Boatbuilding School For Islanders To Open This Month In Solomons

TWENTY-FOUR young islanders from six Pacific territories will be trained as boatbuilders at a school that the South Pacific Commission will open in July at Auki, Malaita, in the British Solomon Islands. During a two-year course they will be taught boatbuilding and repairs, and how to instal and service small diesel marine engines.

The trainees will come from Papua and New Guinea, British Solomon Islands, Netherlands New Guinea, Gilbert and Ellice Islands, New Hebrides and the United States Trust Territory. All were specially selected, and have already had practical training in carpentry and woodwork. (A list of trainees appears at the end of this article).

Actively co-operating with the South Pacific Commission in arranging and running this Course are the Bureau of Technical Assistance Operations of the United Nations, which will pay the salary of the instructor and part fares of the trainees, and the Government of the British Solomon Islands, which is supplying the buildings. The Commission is providing machines, tools, timber and other materials for the boats that are to be built, and will also maintain the trainees during the Course.

The instructor for the Course will be Mr. Cecil Fisher, who was formerly with the Steamship Trading Company of Port Moresby, where he taught boatbuilding to islands apprentices for many years.

To assist trainees, an illustrated boatbuilding guide has been specially prepared by Mr. Arthur Swinfield, a well-known Australian naval architect who was instructor in boat building and marine engine installation and operation at the fisheries training course for Pacific islanders held by the Commission at its headquarters in 1956-57.

Last year, in collaboration with Mr. H. van Pel, the Commission's fisheries officer, Mr. Swinfield designed especially for Pacific conditions a 25-foot live-well motor fishing vessel, which may be adapted for carrying cargo*. During the Course three of these craft will be built, among others.

Increased fish production in the Pacific was one main objective of the Commission in setting up this Course. Again, in most territories there is a real need for small workboats for coastal and inter-island transport of copra, shell and general cargo. By training Pacific Islanders to build and use modern boats, the Commission hopes that both fish production and cargo-carrying facilities will steadily improve throughout the region.

### List Of Trainees

BRITISH SOLOMON ISLANDS PROTECTORATE

| | |
|---|---|
| Silas FORSALA | LUSIANA |
| John KERIPE | MAOMAIGIZO |
| Gaspare KONA | David PRATT |
| LII | Maselino PULE |
| Avan LONDO | Aniseto WARITO |

GILBERT AND ELLICE ISLANDS COLONY

| | |
|---|---|
| Taitai MASE | Henry REINER |

NETHERLANDS NEW GUINEA

| | |
|---|---|
| Thimotheus AB | Hakon JEUN |
| Nawarissa BAUW | Isaäk PATIPARI |

NEW HEBRIDES

| | |
|---|---|
| John ARU | Roy RARUA |
| JOSEPH | James TAI |

PAPUA AND NEW GUINEA

| | |
|---|---|
| Loloma DEVISI | Geno ULAPA |
| Thomas SYMANEN | |

UNITED STATES TRUST TERRITORY OF THE PACIFIC ISLANDS

Alexsander KUBO (Alternate, Ernist LUDWIG)

Above: Bora Bora fishermen setting a net for trevally follow a traditional pattern. Right: The fish caught are held alive in a temporary enclosure until sold.

# The Utilization Of Marine Resources In French Polynesia

*This article reviews resources of lagoon, reef and sea in French Polynesia and discusses methods and problems of exploiting them.*

By MICHEL ANGOT*

THE Polynesian is a born sailor. This was recognized by the early navigators, and became even more evident as ethnological studies proved the astonishing scope of his migrations through the vastness of the Pacific. Further proof is given by the remarkable seamanship that the Polynesian displays in even the frailest of craft.

His being at home on the water, coupled with an acute gift for observation, soon made him familiar with all forms of marine life to the point of knowing their habits as related to seasonal variations. He used this knowledge to develop the art of fishing, and the sea then became his main source of protein food.

The Polynesian's fishing methods became highly specialized, almost to the extent that each species of fish was taken according to a special technique. An excellent description of the various types of gear and of their operation was written in 1950 by M. Legand, a marine biologist of the French Institute of Oceania[1].

Later, Polynesian fishing changed with the times, and certain techniques were neglected while greater efforts were made to catch more easily marketable species. This change was already noticed by Mr. van Pel and M. Devambez, respectively Fisheries Officer and Assistant Fisheries Officer of the South Pacific Commission, during their survey of French Polynesia in 1957[2]. It was even more noticeable for the author, who in company with M. Castel worked in the same territory in November and December, 1959.

In this article are recorded a number of observations made on this visit, during which facilities made available by the French Navy and the local Administration made it possible to visit Tahiti and Moorea in the Windward Islands; Raiatea, Tahaa, Bora Bora and Maupiti in the Leeward Islands; Takaroa and Takapoto in the Tuamotu Group; and finally Taiohae on Nuku Hiva Island in the Marquesas.

It should be pointed out that this series of visits was not sufficient to justify application of the observations made to the whole of French Polynesia. The absence of lagoons differentiates the Marquesas Islands from the other groups; again, fishing in the Gambier Islands and the Austral Group most certainly has its own characteristics, which could not be investigated for lack of time.

The 125 islands in the territory are scattered over 1,544,408,600 square miles between 8° and 25° S. latitude and 124° and 154°W. longitude. To visit them all would have been next to impossible, but I believe that, fragmentary as the data recorded here may be, they give a fairly true picture of the main problems of utilization of marine resources in French Polynesia. (This is especially so since out of a population of 73,000, according to the 1956 census, 36,000 live in Tahiti itself, 17,000 of whom are concentrated in the town of Papeete.) These problems will be examined in relation to the fishery itself, and also as regards marketing the catch.

### The Existing Fisheries

Four types of fishing activities can be defined according to the areas where they take place — lagoon, reef, outside the reef (including any fishing carried out in sight of land), and deep sea fishing (out of sight of land).

1. LAGOON FISHING: The lagoon, being both protected from heavy seas by the reef and easily accessible to the islanders, its resources were logically the first to be exploited.

One of the most important fisheries, both in terms of the number of fishermen involved and of the large proportion of cash resources it represents in the total economy of the territory, is the mother-of-pearl shell fishery (*Pinctada margaritifera*). It is carried out on such a large scale in the Tuamotu and Gambier Islands that regulations had to be imposed to avoid depletion of the

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**Above: After fishing is over the nets are hung to dry in trees along the shore, and the canoes are taken out of the water to rest on permanent stakes driven into the sand. Bora Bora. Right: The canoe of today in the Marquesas Islands is a small whaleboat to which has been added a rudimentary outrigger. Taiohae, Nuku Hiva Island.**

beds and consequent serious crises affecting the activity. All this, as well as a description of actual fishing operations, was very lucidly described by Ranson[3] (1952) and more recently by Domard[4] (1959), and need not be covered further here. I should like to mention, however, that while the technique of pearlshell diving has not changed, the modernization of the craft used is evident, since sailing canoes have disappeared and have been replaced by more rugged types of canoes powered with outboard motors.

Aside from the pearlshell fishery with its special characteristics, the rest of the lagoon fishery can be defined as traditional. Improvements are unlikely to the remarkable and highly-specialized techniques used according to the type of catch desired. It is a type of fishing perfectly adapted to local circumstances through the observations of several generations of Polynesian fishermen. It would be futile to consider the methods used as still capable of being improved sufficiently for yields to be noticeably increased.

In addition, everything leads one to think that the lagoons could not sustain more extensive fishing than is at present practised. In this connection, a comparison between the observations made in the Leeward Islands and Tahiti is enlightening:

—At Maupiti, where fishing is solely for family consumption, fish is abundant enough so that the islanders never experience dietary restrictions.

—In Bora Bora and Raiatea, where the fishery supplies the local market and some fish is also airfreighted to Papeete, the exploitable stock of fish is already decreasing noticeably.

—In Tahiti, where the lagoon waters are constantly furrowed by the fishermen's canoes, fishing grounds have reached a most alarming state of exhaustion; there are now few fish there, and all very small, a sure sign of extreme overfishing.

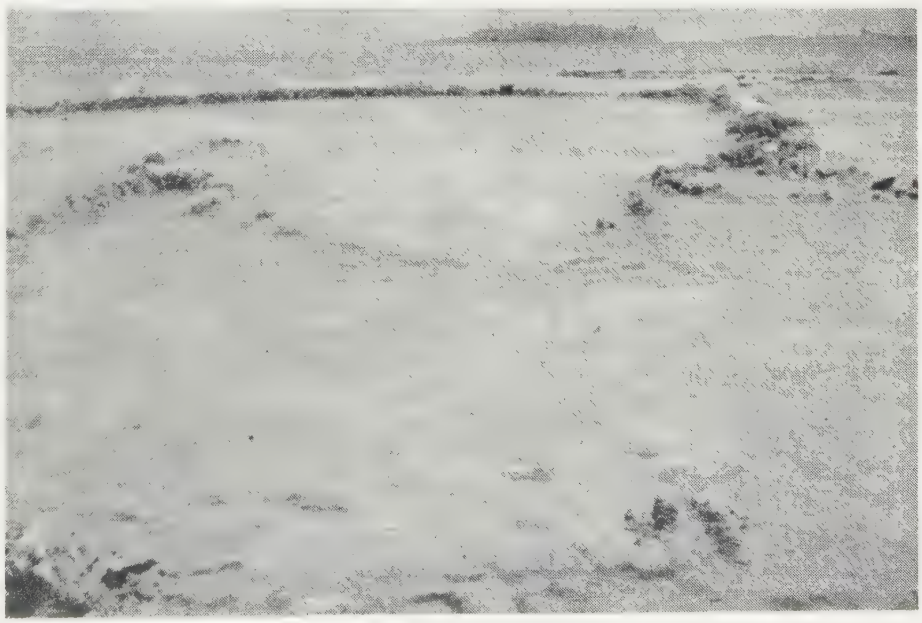
The favourite fishing method is underwater spearfishing. Polynesians have taken the commercial speargun and changed it into an original piece of gear, which is now made locally in the Chinese workshops of Papeete and costs approximately half the price of the European equivalent. The Polynesian speargun has a wooden stock and a slender, very long spear, propelled by a rubber "sandow" and held back until the moment of firing by an extremely simplified trigger arrangement. The range and accuracy of the guns are remarkable.

The complete underwater spearfisherman's outfit—face plate, schnorkel and flippers—is becoming increasingly popular.

In the hands of such excellent divers as the Polynesians, their spearguns, used with as much skill as were the long hand spears of former times, have almost completely exterminated some species in the areas most frequented by fishermen.

The catch comprises fish of all sizes. Species living in crannies of coral heads are taken as well as the rest, for the Polynesians are fish eaters and make no distinction as to species. In Maupiti, spearguns are widely used to catch turtles, in depths of up to twenty fathoms.

It is worth mentioning that this gear



**A fish trap of coral rocks has been built on a reef platform across a known fish "route". Takaroa.**

Present-day Polynesian canoes are almost always mechanized. This one is powered by a 10 h.p. outboard motor. Tahiti.

is used not only in daylight but also at night under certain circumstances.

Very common in the Windward and Leeward Islands, spearguns are fast increasing in numbers in the Tuamotu Islands. There are about fifty on Takaroa and a score or so on Takapoto, for a total population of 500. On the contrary, spearguns are still rarities in the Marquesas Islands, which have no coral lagoon but only a few deep bays.

The second type of equipment most widely used in Polynesia is the handline, for bottom fishing. Generally speaking, nylon lines and hooks of European make are used. Prices of these items are high: 100 francs CFP* for 55 yards of 75 lb. test nylon, and 5 francs CFP for 4 hooks, size 8/0, in the Tuamotu and Marquesas Islands.

Lines are used wherever sharks are not likely to damage the fish hooked. Maupiti fishermen prefer not to use them for this reason. Elsewhere, they are used in comparatively shallow water, or even in great depths as in the Marquesas Islands, where the hooks are let down to over one hundred fathoms.

The nets, wherever used (as for example, in the Windward and Leeward Islands) are characterized by being made specially to catch one—or at most a very few—species of fish whose behaviour is so well known to Polynesians that they are able to set their gear with maximum efficiency.

The "ature" (*Selar crumenophtalmus*) net of Tahiti is a huge affair which may reach a length of 2,500 feet and a height of over 30 feet. It is set where fish enter the lagoon through passes. Other types are used to make fixed traps, leading the fish either into a wire mesh enclosure ("faapua"), or into a place where they can easily be caught with a dipnet ("papai"). Others still are used as gillnets ("parava"). In Raiatea and Bora Bora the nets are always used as traps, chiefly for Carangidae (trevally).

The high cost of these cotton nets, which are all of huge dimensions, require the association of several fishermen, who all participate in the fishing operations.

In Maupiti, net fishing is the privilege of each family, which has its own net. They surround a school of fish, often Scaridae (parrot fish) which until needed for consumption are kept alive in elongated bamboo live boxes, the "apua".

Until recent times catches were often made in fixed traps or fish pounds, built of coral rocks in places where fish were known to concentrate at certain stages of the tides. This technique is tending to become obsolete in the Tuamotu Islands, as it has in the Windward and Leeward Islands. The main reason for this is the transformation of the Polynesians' social environment. As long as they live in communities, the maintenance of the trap and the distribution of catches are shared by all, and cause no difficulty. With the evolution of Polynesian society towards a European type of organization, in which private property is the dominant feature, constant maintenance of a trap belonging not to one person but to the whole village is no longer carried out with the necessary care, and the part played by this method in the subsistence of the islanders becomes ever smaller.

Bottom traps and pots are no longer used to any great extent, though a small type of trap is used on Raiatea to catch mullet.

On the other hand, a new method of fishing has become popular during the last few years, especially around Tahiti. It is dipnet fishing for flying fish, and could almost be called hunting.

The fisherman stands in the bows of a small boat driven by a powerful outboard motor. When a flying fish takes flight, the man steering opens the throttle to catch up with the fish, which is netted in full flight. This type of fishing is carried out by night, a powerful lamp being placed in the bows of the boat.

In this technique, the Polynesians have adapted with remarkable ingenuity modern items (boat, outboard motor and lamp) for the capture of a fish whose habits held no secrets for them.

2. Reef Fishing: Wherever Polynesian islands are surrounded by a reef, this is accessible to the inhabitants, who gather shellfish and crustaceans on it. The shells are mostly gathered for collections, but some, like the giant clam, are taken for their edible meat.

The crustaceans most commonly caught are spiny lobsters. They are generally taken by hand at night with the aid of a lamp. Intensity of fishing is, of course, in proportion to consumption. This is highest in Tahiti, so that the lobsters have become noticeably scarce on the reefs of the Windward Islands, and to a certain extent on those of the Leeward Islands.

3. Fishing Outside The Reefs, In Sight Of Land: This type of fishing is closely dependent on boats and their seaworthiness. In the Tuamotu Islands it is also related to the presence of a pass, enabling the craft to sail out of an atoll or to shelter in a lagoon.

The outrigger canoe is the most common craft in French Polynesia. While admiring its nautical qualities (be it propelled by paddles, sails, or nowadays by an outboard motor of up to 25 h.p.), one is compelled to observe that such a craft has very limited use, being hazardous outside the reefs. In fact, fishermen using canoes do not, as a rule, sail more than half a mile from the breakers. They practice underwater spearfishing near the reefs, or deep lining, or trolling.

Another type of fishing craft is found in Polynesia—it is locally known by the English word "boat". It is most common in Tahiti, but exists in the Leeward Islands, while a few have been seen in the Tuamotus and Marquesas. This boat is a small flush-bottom launch. In the Marquesas, it does not exceed 13

* £stg.1 equals 250 francs CFP.

Catching bonito off the coast of Tahiti. The seabirds circling in the distance have revealed the presence of a school.

feet, and is powered by a 3 h.p. outboard; in Tahiti the average length is 23 feet, and an inboard motor of approximately 40 h.p. is used.

These craft have a crew of two and are used to catch large surface fish, bonito especially (the fishermen are called *bonitiers,* or bonito fishermen) but also tuna and dolphin ("mahimahi"). Very good descriptions of this fishing technique have been given by Legand (1950) and by van Pel *et al.* (1957). The general principle will be sketched here. When a flock of birds "working" a school of fish is sighted, the boat makes for it and, using a short pole and line, the fishing skipper trolls from the stern a lure made of mother-of-pearl. As soon as a fish bites it is pulled aboard, and the mate kills and guts it while the skipper resumes fishing.

This type of trolling of course requires the presence of surface schools which on the one hand can be spotted by the behaviour of the birds, and on the other must be hungry enough to take the lures.

There is, however, a variation of this method which considerably increases the yield. It sprang from the observation that the bonitos or tunas are on the surface because they are chasing shoals of small fish ("ature"). The Polynesians know that the latter will concentrate under floating debris, so they tow a coconut frond near the boat, and then pull it out of the water. The fish sheltering under it take refuge under the boat, which then sails at reduced speed so that the "ature" swim tirelessly just behind it. They serve as live bait to attract the bonito or tuna near the boat, where they take the lures in their frenzied state of unsatiated hunger.

In the two types of fishing described above, the higher the concentration of schools the greater the yield. At the peak of the bonito and tuna season (October to December in the Marquesas Islands, December to March in the vicinity of Tahiti) a good team of two fishermen in a boat can catch up to 200 fish a day.

4. Deep Sea Fishing: Deep sea fishing is non-existent in French Polynesia; local fishermen always work within territorial waters. Mention should nevertheless be made in passing of some recent long-line trials made by Japanese fishing vessels 200 miles and more from land. Catches consisted of large, deep-swimming tunas which are never found at the surface. The yield was not very high.

From 1956 to 1959 some American research vessels also carried out live bait tuna fishing trials on an industrial scale in the vicinity of the Marquesas Islands.

## Marketing Marine Products

Among all the resources extracted from French Polynesian waters at the moment, the only export product is the shell of the mother-of-pearl oyster. It is shipped to outside markets, chiefly in France and Germany, in its unprocessed state—half shells graded according to quality, and bagged.

From 1955 to 1959 inclusive, annual exports varied from 500 to 750 metric tons, and their value from 49 to 86 million francs CFP (in 1959, 610 tons for a value of 67,424,000 francs CFP). These figures may be expected to increase in the future, since research undertaken on the biology of the mother-of-pearl oyster have been used as the basis for the revised fishing regulations recently promulgated.

With the exception of pearlshell, all other marine resources are exclusively used locally. The territory is composed of so many islands, however, that there is no general fish market for the whole of French Polynesia, but as many markets as there are islands.

Each market is ruled by inescapable laws resulting from the density of the population and the abundance of fish in surrounding waters. It is therefore impossible to transpose on the territorial scale, observations bearing on a few places only. However, the demographic concentration in the Society Islands, which include the Windward and Leeward Islands (over 70% of the total population of French Polynesia) warrants studying the marketing of produce from the sea under two aspects —outside of the Society Islands and within the Society Islands.

1. Marketing Outside The Society Islands: This is still found in its most traditional form in the Tuamotu Islands. Whether at Takaroa or at Takapoto, fish caught in normal times is merely distributed among the population without any transaction in the form of purchase or barter.

This arrangement is modified only during the period when the lagoons are opened for pearlshell diving. The considerable influx of divers from other islands with their families then results in marketing in the proper sense: the fish are sold on the beach, as soon as the canoes land, in bunches worth 30 francs CFP each. If the catch happens to be too large for quick sale, the surplus is either salted and sundried, or smoked over a fire of coconut husks. The fish thus processed is used for home consumption.

In the Marquesas Islands fish is normally sold as soon as the boats land, at the rate of 15 francs CFP per kilogram (about 2 lb. 3 oz.) of fish in the round and 20 francs CFP per kilogram of cleaned fish. Marquesas Islanders chiefly favour fresh fish. If unavailable, however, they buy from fishermen the strips of salted dried fish which is produced, in particular on Motu Iti Islet, off Nuku Hiva.

2. Marketing Within The Society Islands: In Papeete and Uturoa (the main town on Raiatea) there is a covered marketplace where all produce, including fish, is offered to buyers. Fish is brought in by the fishermen them-

selves, at least in the case of those who work near town. The demand being important on the Papeete market, supplies must be sent in by fishermen plying their trade in outlying districts.

In Tahiti the transport of fish from the landing point is ensured by the buses, known locally by the English word "trucks." The fish are merely hung from the rear of the vehicles, which generally travel at night.

There is some trade in marine products between the various islands of the Society Group, transport being ensured by the flying boats maintaining twice weekly communications between Tahiti, Raiatea and Bora Bora. Lately a mixed system of fish transport has come into being (using Catalina flying boats and Chriscraft-type launches) to bring to Papeete the fish caught in the nearest of the Tuamotu Islands. On each trip from one to two metric tons of fish are packed in ice in metal containers which are unloaded at Papeete, where they must find a quick sale on the market.

There is no cold storage set up specifically designed for fish preservation. In cases of very heavy landings a certain quantity of this highly perishable product may be stored in the modern cold storage installation of the *Compagnie Française des Phosphates de l'Océanie*. This is however a makeshift arrangement, since no deep-freeze installation is available and the fish is stored directly in the three cold storage rooms, in two of which a temperature of 5°F is maintained while the third is kept at approximately 32°F.

Selling prices are essentially variable and very difficult to evaluate, as fish is not sold by weight but by the bunch, referred to locally as a "string". Each "string" generally costs from 30 to 40 francs CFP but this is far from uniform since, for instance, a "string" was made up of 8 trevally at Maupiti, 4 at Bora Bora, 3 on Raiatea and barely 2 in Tahiti. Similarly, bonitos are sold by the unit, and prices which may reach 100 francs CFP in Tahiti when this fish is scarce fall to 10 francs CFP at the peak of the season (December to March).

### Conclusion

This brief account of the exploitation of marine resources in French Polynesia shows that during the last few years, a definite evolution of fishing methods has taken place. Similarly, the marketing of catches is beginning to change.

These remarks are particularly true in respect of the Society Islands, which will, within the next few years, have to effect deep changes in their economy as a result of the rapid development of the tourist trade and of the population increase, both of which are foreseeable now. It will soon be impossible to deal with fisheries problems in the traditional way. Polynesian fishermen have already understood this, as evidenced by their present tendency towards modernization.

I shall only express the hope that this evolution will be carried out in the best interests of all: fishermen, merchants and consumers.

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## Literature Production For The Islands

*(continued from page 43)*

kinds of houses, different customs and speak different languages. So the kind of information which is suitable for one place is not necessarily suitable for another. Thus there is a great need for printed information which has been prepared in the islands themselves.

But then we come up against another difficulty. There is a great shortage of islanders who know how to operate printing machines and how to prepare matter for printing. Hitherto there has been a shortage of the kind of printing machine which is suited to island needs.

So while the Literature Production Training Centre at Honiara is only a first step, it is an important one. It will give islanders new skills, and this in itself is important. The Centre will also enquire into the special problems encountered in using this kind of printing equipment in hot tropical places far away from commercial servicing. This knowledge will be of great value to islands when the time comes for them to install their own plant. But, above all, it is another step in the direction of increasing the ability and knowledge of the islanders in meeting their own problems.

## Native Local Government Councils

*(Continued from page 42)*

took place during the first few years. By the end of 1954 nine Councils had been established. No new Councils were set up during 1955, but during 1956 the rate of expansion was stepped up and four new Councils were started. By June 30, 1959, there was a total of twenty-nine Councils. (In actual fact thirty-one Councils had been established, but in two instances two councils had amalgamated, thus bringing the total back to twenty-nine.)

During the 1958 financial year, when only twenty-three councils were operating, they spent a total of £96,960 on public and social services. This included expenditure on education, health, agriculture, council administration, roads and bridges, transport and law and order. It is estimated that expenditure during 1959 might exceed £115,000.

Most of this money is raised through Council Tax, and the rates vary from Council to Council, depending on the ability of the people to pay. The highest tax rates set are £4 a year for male tax payers, and the lowest is £1. Some of the finance came through loans which the Councils had raised. The Councils do not receive any direct financial assistance from the Administration but it provides all medical supplies used at Council Aid Posts, and all teachers at Council Schools are paid by the Department of Education.

The Councils employ nearly 300 persons who fill the following jobs: clerks, aid post orderlies, agricultural assistants, cocoa inspectors, works supervisors, carpenters, council constables, drivers, boat crew, forestry assistants and labourers.

The Council clerk is a key man, and to ensure that an adequate supply of trained clerks is available, the Administration has established a Local Government Training Centre at Vunadadir, near Rabaul. This Centre also conducts courses of instruction for Council members and cocoa fermentary clerks. The Administration provides the money to train these people, but each Council has agreed to contribute one per cent. of its revenue to the Centre each year to provide extra facilities for the trainees.

### First Conference Of Councils

At the beginning of June 1959 the first Conference of Native Local Government Councils was held at Madang. Each Council sent two delegates to the Conference and submitted items for discussion. The Conference dealt with some thirty-three agenda items and was so successful that it is now likely that there will be a similar meeting every year.

A number of new Councils are now being planned. So far, the conditions in areas where Councils have been established have varied considerably. In the Rabaul area there have been large, compact population groups with a well-developed economy. At Manus, Milne Bay and Daru there have been small, scattered populations with a partially-developed economy. In the Northern District there was a large population group with little more than an economic potential.

Thus, the circumstances under which each Council was established and operates vary considerably, but experience has shown that the Council system, as envisaged by the Native Local Government Councils Ordinance, allows flexibility and can be applied in modified forms, adapted to a variety of conditions.

Nachsa Siren, Assistant Director of Sanitation, and John Brandt, Director of Sanitation, explain to students the principles of a "New Jersey type" mosquito light trap.

# Sanitarians Attend Trust Territory Course On Truk

*From January 13 to February 3 last, twenty-four sanitarians from the seven districts of the United States Trust Territory of the Pacific Islands attended a course in community hygiene and sanitation held on Truk.*

By JOHN H. BRANDT*

IN 1954 the first School of Sanitation was conducted on Truk, in the United States Trust Territory of the Pacific Islands, as basic indoctrination for many young men who found themselves in the new occupation of public health sanitarian. In 1956 the course was repeated in Ponape. In 1958, sanitarians from all districts attended a one-month course in health education held in Guam.

Thus, if the trend of bi-annual training within the Health Department was to continue, another course in community hygiene and sanitation was due to be held in 1960.

The Trust Territory Administration realized that conventional training courses often left the students unprepared to cope with the problems confronting them in their home territories. The many specialized problems necessitated special treatment. Consequently, the Sanitation Course conducted on Truk from January 13 to February 3 last was geared to meet the many diversified needs of the staff of the Sanitation Division.

### 27 Students Attend Latest Course

Invitations were extended to all seven districts. Twenty-four sanitarians attended the course, along with representatives from the Palau District Education Department and the office of the Health Analyst. A total of twenty-seven students were enrolled.

Questionnaires aided in determining in advance the base line of intellect and experience of the students. Thus the staff did not waste time on superfluous elementary matters, nor did it charge naively into fields beyond the immediate comprehension of the students.

It was found that of the group in attendance, 50% of the candidates had attended the Pacific Islands Central School, one was a graduate nurse, another a college graduate in education, while four had received formal training in sanitation at the British Medical School at Suva, Fiji. Only 30% of the students had not attended one or all of the earlier training sessions in public health conducted in the preceding six years.

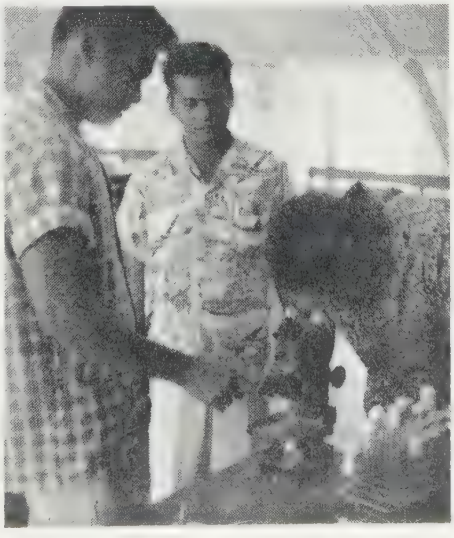
The students—mainly young married men in their middle twenties—averaged 5 years' experience in public health work. Length of work in governmental work ranged from raw recruits starting their careers to veterans with 14 years' service to their credit.

### Course Outlines Prepared

Following evaluation of this information the Course outlines were prepared. The specific needs of the sanitarians in all districts had been carefully predetermined by field observation, by the Supervisory Sanitarian.

Thirty-two separate lessons were

* Director of Sanitation Services, United States Trust Territory of the Pacific Islands.



Extreme left: The author explains to students the principles of fog machine construction and operation. Left: Nachsa Siren explains to Roman Manglona of Rota and Isaac Ngiraeluolw of Palau the differences between species of mosquitoes and flies that they are observing under a dissecting microscope.

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covered under the main topics of microbiology-parasitology, insect-rodent borne diseases, laboratory testing techniques for water, food, milk, etc., food inspection, water and sewage sanitation, refuse, administrative practices, biostatistics, public health law and cultural anthropology.

### Emphasis On Health Education

All through the Course, emphasis was on health education and the necessity for teaching sanitation and hygienic practices to the populace, rather than using enforcement methods to make them accept poorly-understood Western concepts of disease transmission and control. Special lessons in teaching techniques and health education media and methods were prepared and presented.

Classroom facilities, dormitory space, and dining room services were available at the vacated former site of the Pacific Islands Central School on Truk, which had been moved to new quarters in 1959. Laboratory facilities of the Truk District Hospital and the Inter-District Health Office were utilized.

### Ten Instructors

A staff of ten instructors was organized to cover the wide variety of subjects. Participants included the Assistant Director of Public Health, who taught microbiology; the Public Health Analyst, who discussed bio-statistics; the Chief Justice and District Attorney, who taught public health law, and two representatives of the Truk District Education Department, who taught teaching techniques and cultural anthropology. The Director of Sanitation and Assistant Director presented the various lectures and discussions on environmental sanitation, parasitology and laboratory methods.

On the assumption that a general understanding of basic health principles already existed in the group, the teaching of more technical concepts was stressed. While the Trust Territory and its problems are still predominantly rural, certain communities are approaching the time when municipal water, sewage and refuse disposal must be considered. The students all received thorough instructions in these practices.

### Further Course In 1962

After 2½ weeks of long classroom hours, of peering through microscopes, of examining technical equipment, and learning of the intricate life cycle of human parasites and of the multitude of human illnesses which can be controlled through proper sanitation, the students departed for their home islands.

Though the Course had been a difficult one, all agreed it would help them in their work, and unanimously considered it should have been longer.

In 1962, it will be an even better oriented group that will face the instructors for further training in public health, hygiene and community sanitation.

# Tutaka In The Cooks

*In the Cook Islands the custom known as* tutaka, *or village inspection, has been part of community life from olden times.* Tutaka *are still held today, primarily in the interests of public health. Characteristically, they usually develop into happy social occasions during which those whose homes have been visited often join in the* tutaka *afterwards.*

By PUPUKE ROBATI and LEONIE MARTIN*

IN the Cook Islands there is a custom known as the *tutaka*. This is in fact an inspection of an entire village—or indeed sometimes an entire island—by leaders, local Women's Committees and Health Department staff.

Miss Judy Lang of the South Pacific Health Service, speaking on practical aspects of good nutrition to members of the Tautu-Vaipae Au Vaine, Club, Aitutaki, Cook Islands.

*Tutaka* have been a part of village and community life for many years; in fact, they apparently have an origin in pre-European times, when regular village inspections of agricultural activities were conducted by the *Ariki* (Chiefs). When the first missionaries arrived they adopted the custom, making it a *tutaka* each Friday—to ensure orderliness on the Sabbath.

In later years the *Au Vaine* were formed in the villages of several islands of the Group. These comprised groups or committees of women who were given statutory powers of local authority. Among other things this involved keeping the village free of stray animals, and the imposition of fines on the owners of any strays. Usually the fine was paid, since otherwise the owner would face court proceedings and presumably a heavier fine. Unfortunately these powers seem to have lapsed of recent years, and this duty is not always undertaken by the clubs. Much of their interest lies also in handcrafts such as mat making from pandanus leaves, plaiting coconut roofing, making *tivaevae* (patchwork quilts), and doing other fine needlework.

These handcraft activities, of course, have relationship to the general standard of cleanliness and tidiness of the homes. Unfortunately, one occasionally suspects that these articles are made mainly to be used for display on such occasions as *tutaka*. They do not become, as they should, part of the everyday standard of living of the people.

* Assistant Medical Officer Robati attended the SPC Health Education Training Course held in Nouméa in 1957, and was later placed in charge of public health work at Rarotonga. Miss Martin is Health Education Officer, South Pacific Commission.

Below: Mrs. Ryan (centre front), in charge of public health nursing, and district nurses, photographed by Miss Martin at Rarotonga. On Mrs. Ryan's left is the senior nurse, Mrs. Tata Fariu, who attended the Health Education Training Course held at Commission headquarters in 1957. Right: A.M.O. Pupuke Robati (centre row, left), with health inspectors and mosquito control staff, taken near the Public Health Office at Rarotonga Hospital. A.M.O. Robati also attended the Health Education Training Course in Noumea in 1957.

**Above: Typical open kitchen with ducks and fowls (often cats and dogs as well) wandering freely about it. Rarotonga, Cook Islands. The health staffs are trying to teach people to screen their kitchens from animals. Right: Children drawing water by hand from an open well, Nikaupara village. Wells of this kind are subject to contamination, and may serve as breeding places for mosquitoes. They can also be dangerous for very young children.**

With the development of better Health Department services—in particular, the appointment of health inspectors and mosquito control staff—much of the enforcement aspect of village cleanliness has been taken over by these officials. A note is taken of any conditions which infringe regulations, and advice on them is given later. The greatest power that a *tutaka* appears to have would be in the force of its moral and social persuasion on the community to improve living standards.

The day of the *tutaka* is known in each village in advance. There is usually a preliminary cleaning-up session a day or two before, and all the best mats and *tivaevae* are brought out on display in each house. Usually the rubbish outside is also cleaned up. Even if the owner is away, homes are left open for inspection, and everywhere the staff and Women's Committees are free to enter and observe.

Normally the nurses and members of Women's Committees look at the conditions inside the houses, while the men —usually the health inspectors and mosquito control staff—look to the premises outside. Follow-up visits to advise on action that should be taken are generally made about a week later.

Many of the villages are large and scattered, and it takes a full day or almost to cover the whole area. In the past this has left little time for more than a minimum of inspection and noting down of whatever needs following up. It seems a pity that this is so, since this lessens the possibilities of discussion with the housewives and house-owners on ways of improving general living conditions. It is this aspect of the *tutaka* which might well in the future be given greater emphasis, so that it truly becomes a means of educating people for better health.

### A Social Occasion

If you want to go on a *tutaka*, choose —as we did—a bright sunny day. It may well be hot and dusty but this will be far preferable to the oceans of mud that otherwise one might have to plough through! Wear, too, a pair of comfortable shoes; otherwise you will not stay the distance.

We met early in the morning—district nurses, health inspectors, mosquito control staff, and village women—in this particular case, members of the local Child Welfare Committees. It was a happy occasion, and almost everyone wore flowers—either wreaths, leis, or the traditional flower behind the ear. There was much chatter and laughter as we set off to make our first visits. In spite of the long day ahead, and the fact that much work had to be done, we were all in holiday mood.

We were warmly received at every house we visited, and invited inside to see the proudly displayed mats and *tivaevae*. Most of the houses have gardens; and there were hibiscus, frangipanis, lilies, gerberas and many other flowers blooming on the way. Often we were given flowers as we left the homes. It is customary, too, for those whose homes have been visited, particularly the members of the Women's Committee involved, to join in the *tutaka* afterwards; so it is with a growing band of people that the *tutaka* proceeds during the day.

From time to time we found poor living conditions: a latrine that was not fly proof, perhaps a kitchen where the hens and dogs seemed to share equally with the family in the preparation of the food, or maybe a bath house where the drainage was inadequate and mosquitoes were breeding close to the house. Sometimes it was neglected rubbish which gave breeding places for mosquitoes and flies.

On each occasion a note was taken of the conditions that were found, and it would be the responsibility of one of the health inspectors or mosquito control staff to return later and discuss with the owner the reasons why his house needed attention in an effort to persuade him to take the necessary action.

For a number of reasons it is sometimes difficult to improve conditions. Funds may not be available; or, as often happens when the occupier of the premises has come from another island, he does not have sufficient land to set out his property in the best way.

Sometimes he does not understand the reasons why he is causing danger to his own or other people's health, or it may be that he himself is suffering from some chronic condition such as filarial fever, which means that he cannot manage the work that otherwise he would be able to undertake. This is unfortunately a vicious circle—a sick man cannot make or keep his premises clean; and dirty premises cause more sickness.

Fortunately we were often able to congratulate the owners on the way in which their homes were kept. Many of them were not only spotlessly clean inside but the grounds outside were neat and tidy also. The gardens were well kept, and flowers were used to decorate the homes. Some people had started kitchen gardens, and we hope that these will be continued and extended so that a greater variety of fresh food will be available for each family.

We stopped for a welcome drink of coconut milk at the home of one of the Committee members. Then, refreshed,

we set off again, and on our way this time saw one of the bakeries with cakes for the day just coming from the oven. On again from house to house until lunch time, which again provided a welcome rest, this time at the home of the President of that particular Committee who was also one of the *Ariki*.

Then we set off once more, to complete our afternoon round. This time it was a new area being opened up at the head of a little valley. Here new homes are being built, and there would be wonderful opportunities for facilities to be exactly right. Unfortunately, lack of money sometimes comes in again, and not all of these homes are so well built from the health viewpoint as they might be. And so on to the end of a hot and dusty, though very pleasant, day.

As the shadows were lengthening we returned home to a very welcome bath, but it was not the end of the *tutaka*. There were still the follow-up visits to be done the following week, and, we hoped, some health education, even for those who did not necessarily have to make improvements.

The New Hebrides

*(continued from page 24)*

acres, and coffee plantations, approximately 7,500 acres. These last two crops were later neglected in favour of the coconut.

Unfortunately, until recently no thought was ever given to the replanting of coconut trees. Today the situation is changing. There is a renewal of interest in cocoa and coffee planting, while new plantations of coconuts are being established in several islands.

In order to give an idea of the development of agricultural production in this territory, a case in point is that of copra, the exports of which have risen from 4,500 tons in 1914 to more than 35,000 tons in 1959.

The following table outlines the importance of the main New Hebridean products:

It may be of interest to make a brief survey of these various products.

COCONUT PRODUCTION: Coconut production shows original characteristics in the New Hebrides. Not the least of these is the method used for curing copra, which is both smoked and dried.

This method has been strongly criticized by various experts, and it is true that the copra thus produced is not very attractive in appearance. It would appear, however, that smoked copra as it is prepared in the New Hebrides keeps better during transit to Europe. In any case, the New Hebridean planters have never been encouraged until today to improve their technique for curing copra.

Those who at great cost bought modern hot-air driers have obtained only meagre increases in value for the very fine copra thus produced. They also had to bag their product for shipping, while smoked copra is normally exported in bulk. As a result they incurred extra expense which further reduced the profits they were hoping to realize from their laudable efforts.

The French oil mills, especially in Marseilles where the New Hebrides smoked copra is treated, appear to have become used to this product, and do not seem to be interested—for the time being—in any improvement in its quality[1].

It would not be advisable, however, to continue with this method of smoke-drying copra in the New Hebrides. In all other Pacific islands, as in other parts of the world, considerable progress has been achieved in the preparation of copra.

There is a danger that one day the New Hebrides copra may not find a buyer on account of its poor quality and

[1] As regards markets for the copra of this territory, the last few years have seen two interesting developments—exports of copra to South American countries, and also the appearance of a new prospective buyer, Japan.

| PRODUCTS OF VEGETABLE ORIGIN | 1957 (METRIC TONS) | 1958 (METRIC TONS) | 1959 (METRIC TONS) |
|---|---|---|---|
| *AGRICULTURE:* | | | |
| Copra | 33,839 | 33,547 | 35,067 |
| Cocoa | 855 | 921 | 856 |
| Coffee | 195 | 235 | 256 |
| Polynesian Arrowroot (*Tacca*) | 0.5 | 0.5 | 0.5 |
| *FORESTRY:* | | | |
| Sandalwood | 42 | 57 | 65 |
| Kauri | 612 | 325 | 155 |

| PRODUCTS OF ANIMAL ORIGIN | 1957 (METRIC TONS) | 1958 (METRIC TONS) | 1959 (METRIC TONS) |
|---|---|---|---|
| *FISHERIES:* | | | |
| Trochus and Green Snails | 29 | 33 | |
| Frozen Fish | — | 3,509 | 3,709 |
| *ANIMAL HUSBANDRY:* | | | |
| Wool | 1.9 | 0.9 | 1.5 |


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the competition of better copra of different origins. Consequently, it is necessary to encourage the use of hot-air driers among the planters, and some of them are already aware of the advantages.

The problem does not only concern European planters, for while prior to World War II they produced most of the copra exported, the situation is different today, for indigenous production probably represents at least 60% of the exports.

In native villages it is easy to encourage the use of hot-air driers of the type evolved by the Department of Agriculture of the Condominium[2]. This very cheap type of drier, simple to build and use, will ensure the necessary improvement of the native product. Moreover, European planters may be inspired by this model when building their own hot-air driers.

To stimulate this improvement of copra it will probably be necessary to create a Grading Department within the Condominium Administration.

The curing of copra is not the only aspect of New Hebrides coconut production which needs attention. The replantings now carried out should be supported by selections with a view to obtaining better coconut trees. The simplest solution would be first of all to perform these selections in nurseries. In addition, it is certain that palms suitable for long-term selection and breeding programmes can be found among the coconut population of the New Hebrides.

Cocoa, Coffee And Other Crops: Cocoa trees growing in the New Hebrides are of widely differing origins—*Criollos, Forastero, Calabacillo,* and *Trinitarios.* They certainly include trees suitable for massal or clonal selections likely to improve the quality of cocoa.

As in the case of copra, it is also necessary to improve the curing of cocoa beans. This offers no difficulty from a technical point of view; it would only require active extension work and propaganda. A good illustration of the problem is the story of some natives who courageously set out to plant cocoa trees on their village lands. When the time came for the first crop, not knowing how to prepare the product, they cured it like copra, by smoke-drying!

The cultivation of coffee is capable of expansion chiefly in the southern islands; for example in Tanna where *Arabica* grows well and where the natives are in need of a cash crop. However, *Robusta* gives excellent results in the northern islands and is still present on numerous plantations.

Still in the field of agricultural production, it should be noted that there is a continuous export, in small quantities, of arrowroot flour from *Tacca leontopetaloides.* It is prepared by the congregation of the Presbyterian Mission and exported by the latter.

Finally, over the last few years there have been occasional exports of peanuts —four tons in 1959.

Timber Production: Regulations providing for strict control of timber production in the New Hebrides are urgently needed, for sandalwood as well as kauri, in order to prevent severe deterioration, or indeed complete exhaustion of the exploited stands. This control is all the more necessary if one considers that possibly new timber concerns, other than those already in existence, may be created. Through ignorance they may waste the existing tree resources of the Archipelago, which are not as large as generally assumed. To safeguard these resources, a detailed inventory could well be made.

Products Of Animal Origin: Green snail and trochus shell fishing has long been a source of substantial income for many coastal villages in the New Hebrides. The conditions under which this activity has been carried out during the last fifty years, and more particularly the complete lack of protection (such as a minimum size and close season for the shells would have provided) have, as might be expected, resulted in these two shells becoming scarce. Moreover, due to high prices between 1954 and 1957, fishing became more intensive and the problem noticeably more acute.

The production of trochus shell, which had risen from 51 tons in 1950 to 122 tons in 1955, reached only 73 tons in 1957, although prices reached and even exceeded £A300 a ton that year. To avoid complete depopulation of the reefs, which are comparatively limited in area, the only solution was to close fishing completely. This was done in February 1958. The same decision was taken in respect of green snail, which had followed the same trend.

Small quantities of trochus and green snail are in fact still collected in coastal areas purely for subsistence purposes, but there has been no sale of shells since the first quarter of 1958. A survey of the main reefs carried out in July 1959 by M. Louis Devambez of the South Pacific Commission, has shown the need for continuing the ban on trochus and green snail fishing. (The price of trochus shell having fallen at about the same time, this decision was further justified on economic grounds.)

In the last few years, however, the most outstanding developments in the New Hebridean economy have been in the field of fisheries. Following the establishment of a Japanese fishing Company in Espiritu Santo, frozen tuna is now an important item among the exports of the Group. This firm—the South Seas Fishing Company—also cures part of the catches on the spot and exports to Japan several qualities of *katsuo Boshi*

[2] An example is the Tagabe drier, described elsewhere in this issue.

# 25-Foot Auxiliary Cutter For Pacific Fishermen

*Plans Available Giving Full Constructional Details*

*In the* BULLETIN *for last October, brief details were given of a 25-foot auxiliary cutter designed by a leading Australian naval architect in collaboration with the Commission's fisheries officer, for use in Pacific waters.*

*Intended primarily for use as a "live-well" fishing boat, she could equally well be used for trochus fishing, carrying copra, or as a general workboat.*

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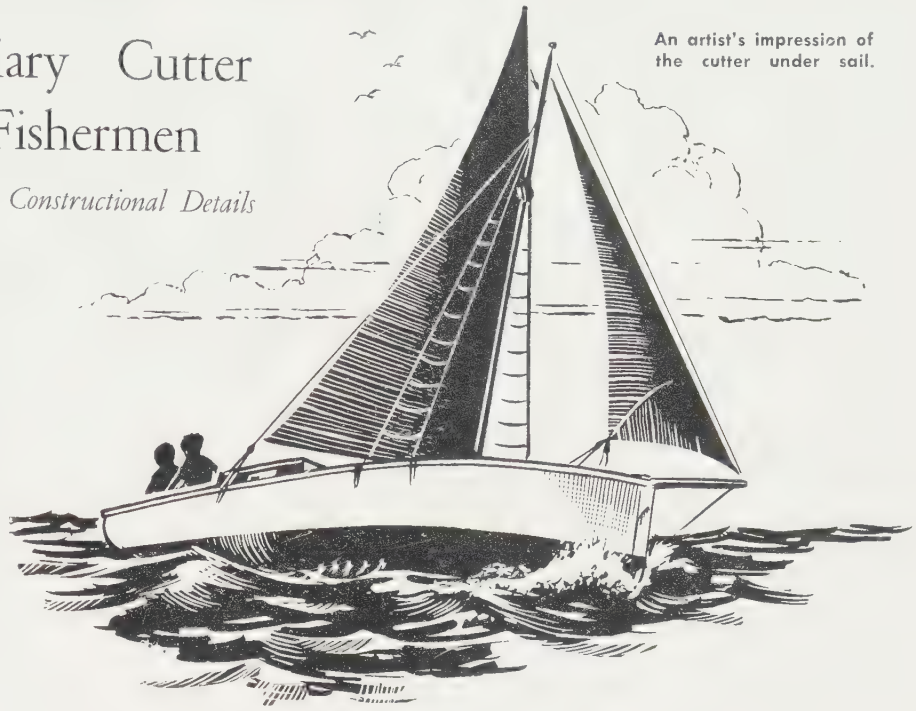

An artist's impression of the cutter under sail.

NUMBER 2 . . . *depicts the general arrangement and sail plan.*

NUMBER 3 . . . *gives details of stern, frames, stem and transom.*

NUMBER 4 . . . *shows details of the amidships section and of deck framing and rudder.*

NUMBER 5 . . . *gives offsets and lines for an identical vessel but with "vee" bottomed lines.*

(smoked and dried fish). The Company also makes cooked and dried fish flakes of very good quality, for sale on the local market. (Incidentally, more use could well be made of this product in the local diet.)

Catches by the Company's ships include, on an average, 65% albacore, 15% yellowfish tuna, and 10% marlin, bonito and other species making up the balance. Another by-product is shark fins, which are exported to Japan.

These are not the only products of animal origin from the Archipelago, since the New Hebrides exports some wool — mostly from Erromango — and also cattle hides (13 tons in 1957 and 4 tons in 1958). Cattle raising is indeed important in the Group, cattle being used both for keeping the coconut plantations clean and to provide fresh meat for the plantations and for the two main towns of Port Vila and Luganville. Recently the export of meat to New Caledonia was tried.

In 1958 there were about 40,000 head of cattle in the New Hebrides—not to mention wild cattle. European breeds are predominant, but zebus have been introduced recently and cross-breeding is now frequent. Some planters are deeply interested in animal husbandry, and today they are rightly endeavouring to improve the grass cover in coconut groves so that it may provide good quality pastures.

In addition, pig raising is of great importance in the native villages where it plays an important part in the traditional subsistence economy. Today many pigs are also raised in European plantations.

### Conclusion

The South Pacific Islands gave rise to a number of diehard myths and clichés. For the civilized populations of Europe and America, the Polynesian Islands are the last paradise, and some Melanesian Islands the last refuge of man-eaters and head-hunters who still live in the Stone Age! The New Hebrides are often ranked among the latter, without regard for the fact that since the last war the inhabitants have become conscious of their under-development and are trying to overcome it. Thus, in the mountains of Espiritu Santo, one finds so-called primitive people who nowadays plant cocoa and coffee. Many New Hebrideans have bank accounts with the local branches of the Commonwealth Savings Bank or the Bank of Indo China, while native co-operative and trading societies are being formed in several islands.

For the time being these are admittedly mere local ventures with limited scope. Often they are up against serious difficulties, due to the lack of sufficient education or of adequate technical aid. However, conditions are eminently favourable for the setting up of a programme for the economic and social development of the indigenous population. This has been fully understood by the Department of Agriculture, and despite limited means, efforts are being made to establish in a few islands, organisations for agricultural propaganda and extension work.

The missions work in the same direction and some of them have now opened schools where they give practical agricultural training. They also endeavour to assist in the formation of co-operatives.

In short, an era of native development is opening in the New Hebrides, but in order to avoid disheartening failures it is urgently necessary to improve the local services of education and technical assistance.

The New Hebrides are undergoing a modernization process, and new resources are being tapped. A French company of considerable standing has just begun to exploit a deposit of manganese in Efate Island, while prospecting for minerals is being carried out in other islands. European planters who for a long time were content with traditional

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methods now equip their plantations with modern agricultural machinery and plant for processing their crops.

In view of all these efforts we may hope for quick development in the New Hebrides economy, accompanied by promotion of the welfare of the indigenous population. An intensified programme in the field of education would undoubtedly greatly facilitate progress.

## Commission's Health Programme Under Review

The South Pacific Commission's programme of work for promoting better health among people living in the Pacific islands will be studied by the health members of the Commission's expert advisory body, the Research Council, when they meet in Nouméa from July 12-20. (The social and economic development members of the Council met in 1958 and 1959 respectively.)

While the Commission's full health programme will be under review, special attention will be paid to its work in health education, nutrition, and mosquito-borne diseases, and to their public health aspects, all of these being fields approved in 1957 for concentrated effort.

Specialists eminent in the fields of nutrition and public health will attend the meeting as consultants. They are Professor H. Gounelle, a leading French authority on nutrition, and Sir Selwyn Selwyn-Clarke, an eminent English specialist in the field of public health.

The report and recommendations of the meeting will be considered at the next annual session of the South Pacific Commission, scheduled to open at its headquarters in Nouméa on October 12.

## International Institute Of Differing Civilisations To Meet In Munich

The International Institute of Differing Civilisations will hold its thirty-second study session in Munich from September 19-22 next, taking as its theme, "Problems of Administrators in Tropical and Sub-Tropical Countries".

## PICTURE CREDITS

Acknowledgement is made for illustrations reproduced in this issue as follows: Front cover photo, p. 34 (right), 36, 37, 59, 60, 61, Rob Wright, Official Photographer, Fiji; 25-28, H. van Pel; 31, 32, 33, 34 (left), 40, 41, 42, 66, Australian Official; 22, 23, 24, 38, Jacques Barrau; 53, 54, Leonie Martin.

Special acknowledgement is made to the French Institute of Oceania for the black and white drawing appearing on page 63. It was prepared by an Institute artist from a watercolour sketch made by the author of the article, Hubert W. Simmonds.

Above: Cocoa pods and flowers, strongly Criollo type. Right: Seedling cocoa under Malayan dwarf coconuts.

# The Cocoa Industry In Fiji

*Devoted entirely to cocoa, the September 1959 issue of the* AGRICULTURAL JOURNAL *published by the Fiji Department of Agriculture forms a valuable practical guide for growers. It is reviewed below by a leading Pacific authority on cocoa . . .*

D. R. A. EDEN

THE September 1959 issue of the *Agricultural Journal,* published by the Department of Agriculture, Fiji, is devoted entirely to cocoa. The contributors—all specialist officers of the Department—have combined to produce an authoritative and interesting publication. It is well-illustrated with photographs and diagrams, and contains a very effective colour plate depicting the characteristics of cocoa beans. This shows, in excellent colour, the differences between well-fermented and insufficiently-fermented cocoa beans, and depicts the effects of mould and insect attack.

The issue of the *Journal* is, in fact, a short textbook on cocoa. Only a writer on technical subjects could appreciate the difficulties of producing such a work. It is not a question of what to put in, but rather of what to leave out. It is inevitable that the need for brevity must lead to the sacrifice of some subject matter, but the contributors have contrived to condense their articles so well that the latter have acquired the additional merit of providing easy reference.

Although primarily written as a guide to cocoa growers in Fiji—and also, as the Director states in his Introduction, "to stress the importance with which the Department regards the development of a cocoa industry in this Colony"—the *Journal* should prove of value to the many throughout the Pacific who have planted, or who intend to plant, cocoa.

### The Importance Of Shade

The *Journal* opens with an article, THE ESTABLISHMENT OF A COCOA INDUSTRY IN FIJI. It gives a short history of the establishment of a cocoa industry in Fiji, and reviews its present condition. The author, L. W. Harwood, makes several strong points on the question of shade. He states:

"Once the farmer realizes that cocoa must have overhead shade, especially in its young stages, and that best results are achieved by careful manipulation of the shade as the tree grows, the standards of planting and maintenance will improve appreciably.

"The successful introduction and establishment of Dadup (*Erythrina lithosperma*) from Western Samoa (into Fiji) has made a quick-growing, permanent shade tree available in rapidly-increasing quantities".

Fiji is obviously taking heed of results obtained over many years in Western Samoa by the use of *lithosperma,* a legume of proven merit and perfect habits.

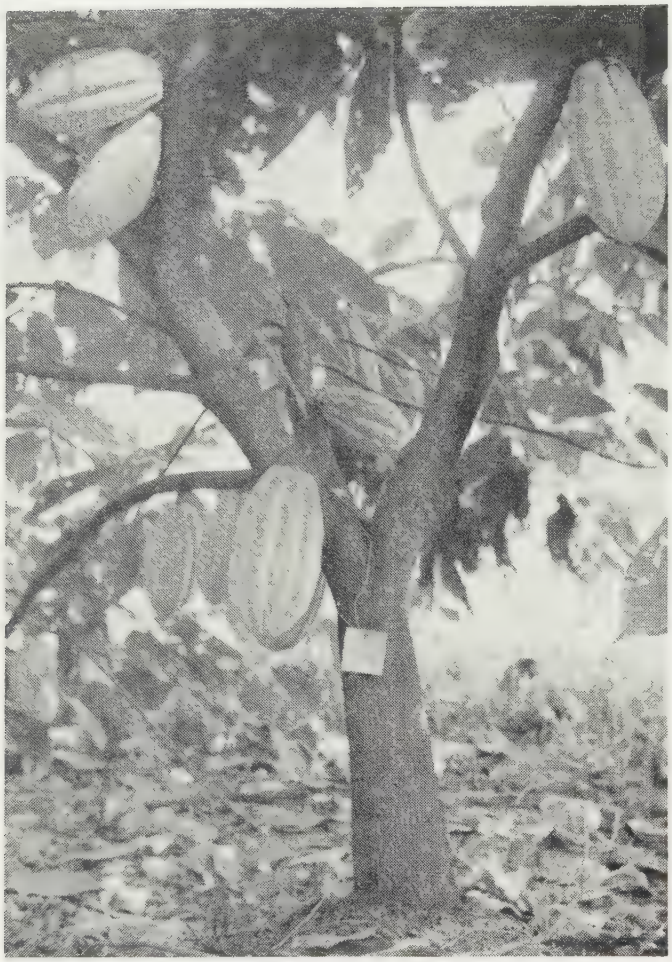
In another article entitled COCOA PLANTING, Harwood advocates Dadup and damns with faint praise *Leucaena glauca* (Vaivai) by writing, after listing other alternative shade legumes:

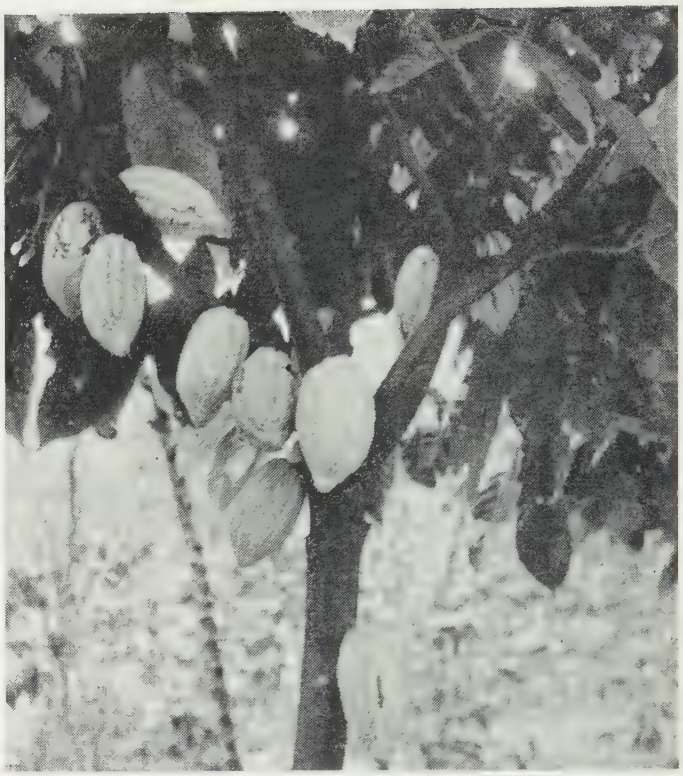
"Vaivai could be used in the wet zones, but is not advocated for the dry areas where, because of its prolific seeding it may be difficult to control".

This understatement will be appreciated by planters in Papua and New Guinea where, in some areas, they have been forced to control acres of vaivai by the use of hormone tree poison spray.

### The Botany Of Cocoa

NOTES ON THE BOTANY OF COCOA, by C. Walker, leads off with a concise





Left: Seedling cocoa (Lafi No. 7), six years old, Naduruloulou.
Above: Seedling cocoa, Trinitario type, six years old, Naduruloulou.

description of environment necessary for the growth of cocoa:

"All varieties of cocoa are trees of the lowest storey of lowland tropical forests. The bulk of the world's cocoa is grown within 10 deg. north and south of the equator and below 1,000 feet in elevation, with the limits of cultivation at about 20 deg. north and south".

This article gives botanical facts on component parts of a cocoa tree. A section headed FERTILISATION is quoted below in part:

"Investigations have shown that pollination is effected by insects, but the picture is as yet incomplete.

"To complicate the fertilisation question still further, there are two kinds of cocoa trees:

(1) *Self compatible.* On a self-compatible tree the flower can be pollinated by its own pollen or that of another self-compatible tree and normal ovule development then takes place;

(2) *Self-incompatible.* The flower of a self-incompatible tree must be pollinated by pollen from another tree for normal ovule development to take place. For self-incompatible types it is therefore necessary to have a mixed population of trees so as to ensure pollination.

"If a high-yielding, self-incompatible tree is multiplied vegetatively by means of cuttings and then planted out in a mono-clonal block, there will be little chance of getting any yield owing to the lack of pollinators which should be present in the ratio of one pollinator to every three incompatibles . . . it is always the best policy to plant a mixture of clones in a plantation in order to guard against this incompatibility".

In other words, if a planter proposes to plant high-yielding clonal cocoa, he is advised to ensure either that he obtains rooted cuttings from self-compatible mother trees, or a mixed bag and ensure that he obtains and plants one self-compatible seedling with every three self-incompatibles. The Department supplying the rooted cuttings will presumably advise him as to compatibility or otherwise of the young cocoa he obtains.

Another nice answer to the oft-repeated planters' question "Why have my trees got cherelle wilt?" is given by Walker in his section headed FRUIT:

"Within the first six or eight weeks of their development many of the young pods, or 'cherelles', wilt, turn black and dry up. This wilting is not a symptom of disease, as the cause is physiological rather than pathological. The cause of cherelle wilt is thought to be competition for water and nutrients between the developing pods themselves and also between the pods and leaves. Cherelle wilt can be regarded as the cocoa tree's natural way of thinning pods to the number that it can develop to maturity with the nutrients and water at its disposal, without overbearing and exhausting itself".

Under the heading of VARIETIES, Walker explains present-day meanings of the terms Criollo, Forastero and Trinitario. These definitions are timely because there has existed some confusion on the subject. His definition of Trinitario, the most common type of cocoa in the Pacific, may prove of wide interest:

"Trinitario—Today this term is applied to the type of cocoa that has evolved from the hybridization of the Criollo and Forastero types. It represents a hybrid population which is most heterogeneous and complex . . . A single pod may bear the complete range of external characteristics of Amazonian Forastero to Criollo, while the cotyledon colour of the seeds of a pod showing the external characteristics of Amazonian Forastero may range from white to deep violet.

"To this group, together with the Ecuador Cacao Nacional, belong the fine

Above: Seedling cocoa, four and one half years old, Wailevu, Vanua Levu. Right: A good flush. Rooted cutting, Naduruloulou.

cocoas produced by Trinidad, Ceylon, Indonesia, Papua - New Guinea and Samoa".

### Soil Requirements Of Cocoa

SOIL REQUIREMENTS OF COCOA, by L. W. Harwood and J. W. McPaul, is worthy of close study by planters. In the opening paragraph will be found an example of the condensation of subject matter which is a feature of this issue of the *Journal*:

"A good cocoa soil is one that is fertile, deep, freely drained and well structured, with good moisture holding capacity and possessing all the conditions suitable for proper root development. It should contain an adequate supply of organic matter and be slightly acid to neutral in reaction. A relatively high clay content is necessary since it provides an insurance against fluctuating moisture conditions. However, the clay must not be so heavy as to impede internal drainage or soil aeration. Depth of the water table is important; whilst the cocoa can withstand periodic flooding, the permanent water table should not be less than 2 ft. 6 ins. to 3 ft. below the surface".

While there is a lot of "meat" in the rest of the article, the foregoing statement sums up the soil requirements of cocoa generally and adequately.

### Cocoa Planting

The next contribution, COCOA PLANTING, has been written by Harwood in considerable detail. He commences with shade, which is one of the most important factors in the husbandry of cocoa, and one of the most controversial. He advises cocoa farmers in Fiji on the best methods of shading which are applicable to their local climatic conditions, but, except where Fiji is specifically mentioned, the information given is of general Pacific interest. Except for Western Samoa, where overhead shade for cocoa is dispensed with altogether after the second or third year, most territories have found that some permanent overhead shade is necessary. The *Journal* states:

"(2) Where forest cover or mature coconuts do not exist, or cannot be used to provide permanent overhead shade, the necessary ground, temporary, and permanent shade which is planted instead must be sufficiently developed to provide adequate protection for the young plants before any cocoa is planted.

"(3) A well-distributed rainfall and protection from wind are essential . . . an adequate system of windbreaks should be planted and established before an attempt is made to plant cocoa".

Harwood advocates spacing of 15 ft. x 15 ft. for Fiji, but such spacing is almost generally accepted now wherever cocoa is planted in good, or moderately good, soil. The Trinitario type tree has a radial spread of over 7 ft., and even at 15 ft. spacings, the branches of adjoining trees often interlock. This tendency to size should not be deprecated, because the bigger the tree the greater the bearing area, and, as the horse coper said, "A good big 'un is better than a good little 'un".

The author continues with advice upon four methods of preparing the land. This is given under four headings —TRADITIONAL WEST INDIAN, ESTABLISHMENT UNDER THINNED FOREST, ESTABLISHMENT UNDER MATURE COCONUTS, and ESTABLISHMENT UNDER PLANTED LEGUMINOUS SHADE.

Advice on interplanting bananas as a catch crop to give farmers an income until their cocoa comes into bearing is of course only applicable to territories which have organized banana schemes for the export of their bananas. However, the diagrams showing planned layouts of coconuts interplanted with cocoa will be found of interest in all island groups, and are reproduced here (Figures 2 and 3).

Estimates for bringing one acre of cocoa to the age of four years are given in the *Journal*, and these are of course based on Fijian costs. Such estimates may differ from similar costs elsewhere, but for interest and for comparative purposes, the Table giving this information is reproduced here (Table 3).

The reader is next taken through the establishment procedures of planting shade and windbreaks, given advice on

seedlings and potting mixtures, and advised on the best methods of lining, holing, planting and after-care of the seedlings.

A section under the heading PRUNING contains essential information:

"The seedling plant produces a straight stem called a 'chupon'. When the plant is about eighteen months old and the chupon is 3-5 ft. high it ramifies into 3-5 fan branches which grow out almost horizontally, forming what is called a 'jorquette'. When these branches are sufficiently developed, the tree should be pruned so as to retain 3-4 fan branches.

"The object of pruning, which should be carried out regularly after the formation of the fan branches, are:

(1) to shape the tree so that it consists of one chupon and 3-4 fan branches;

(2) to prevent additional chupons growing through the jorquette;

(3) to facilitate the harvesting of pods which are carried on the main trunk and branches;

(4) to remove dead or damaged shoots.

"A tree should never be pruned when it is flowering or fruiting as this will upset the metabolism of the plant."

Another piece of useful information to planters might be "When in doubt, leave alone", because far more harm has been done by overpruning (saving the removal of chupon growth) than by underpruning.

The article concludes with some remarks on yield:

"Well-managed seedling cocoa should yield up to 5 cwt. of fermented and dried beans per acre per annum, while higher yields may be anticipated from areas planted to rooted cuttings of high-yielding clones."

Figure 2

PLANNED LAYOUT OF COCONUTS PLANTED 30 FT X 30 FT ON THE SQUARE INTERPLANTED WITH COCOA

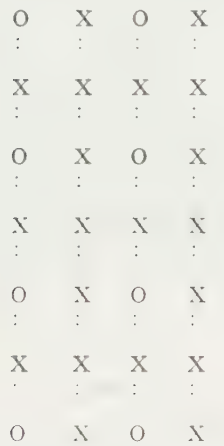


Figure 3

PLANNED LAYOUT OF COCONUTS PLANTED 30 FT X 30 FT ON THE TRIANGLE INTERPLANTED WITH COCOA

O =Coconuts at 30 ft x 30 ft or 28 ft x 28 ft.

X =Cocoa at 30 ft x 30 ft or 28 ft x 28 ft in the coconut rows and 15 ft x 15 ft or 14 x 14 ft between the rows of palms.

: =Temporary leguminous shade, e.g. Dadap, Vaivai (*Leucaena glauca*), pigeon pea, "Madre de Cacao" (*Gliricidia maculata*), etc.

TABLE 3

| | Seedlings | Rooted cuttings |
|---|---|---|
| | £ s. d. | £ s. d. |
| 1st Year— | | |
| Clearing | 11 0 0 | 11 0 0 |
| Lining | 2 15 0 | 4 8 0 |
| Holing | 3 17 0 | 6 1 0 |
| Cutting and planting shade | 7 14 0 | 7 14 0 |
| Purchase of planting material (cocoa) | 6 0 0 | 54 0 0 |
| Planting cocoa | 3 6 0 | 6 12 0 |
| Supplying cocoa | 1 2 0 | 2 4 0 |
| Weeding, mulching and control of shade | 13 4 0 | 13 4 0 |
| Pest and disease control | 3 6 0 | 3 6 0 |
| Fertilizers | 7 10 0 | 15 0 0 |
| Roads and Bridges | 8 5 0 | 8 5 0 |
| Drains | 5 10 0 | 5 10 0 |
| Contouring | 5 10 0 | 5 10 0 |
| Total 1st Year | £78 19 0 | £142 14 0 |
| 2nd Year— | | |
| Replanting cocoa | 1 2 0 | 1 2 0 |
| Weeding, mulching and controlling shade | 13 4 0 | 13 4 0 |
| Pruning | 3 6 0 | 3 6 0 |
| Pest and disease control | 3 6 0 | 3 6 0 |
| Fertilizers | 15 0 0 | 30 0 0 |
| Total 2nd Year | £35 18 0 | £50 18 0 |
| 3rd Year | £35 18 0 | £50 18 0 |
| 4th Year | £35 18 0 | £50 18 0 |
| Totals | £186 13 0 | £295 8 0 |

## The Preparation Of Cocoa

An article, THE PREPARATION OF COCOA, covering many phases and techniques of fermenting and drying, was contributed by V. E. Sills. It opens with definitions of quality and descriptions of chocolate flavour, and leads on to the actual processing of the cocoa beans by fermentation and drying. Methods of fermentation, its temperatures and duration, are covered. The following extracts illustrate the practical nature of the advice given:

"In practice, the heap of seed (cocoa beans) must be large enough and sufficiently well protected against loss of heat to reach a temperature of 112-113 deg. F. (45 deg. C.) after the second day of fermentation . . . There is a definite limit to the size of box that can be used for cocoa fermentations, 5 ft. x 4 ft. by 3 ft. being a common size in most large fermentaries. Anything bigger than this is likely to result in poor fermentations.

"If temperatures fail to reach 112-113 deg. F., more protection or insulation to prevent heat losses is probably required. Low temperatures, if permitted, may favour the development of less desirable types of micro-organisms which give rise to unwelcome foreign flavours in the cocoa . . .

"When correctly fermented the beans are plump and the seed coat separates easily from the enclosed cotyledons. Colour changes may be noted . . ."

The *Journal* describes a number of drying methods and compares sun-drying with hot-air dehydration. It states:

"Where small quantities of cocoa are required to be dried and there is adequate sunshine and a good drying wind, sun-drying is a very practical and satisfactory solution.

"Hot-air drying has the advantage of speed and, of course, is independent of weather conditions . . .

"The speed with which cocoa is dried certainly has a marked influence on quality. It appears that the comparatively slow sun-drying process provides effective means of getting rid of unwanted acidity — acidity derived from bacterial action during fermentation. The faster hot-air drying method does not remove the acidity so effectively and, consequently, cocoa processors often employ supplementary measures to assist in the removal of the remaining acidity".

Some details of the Samoan type drier, Martin drier, and the McKinnon rotary drier are given, together with their approximate costs in Fiji.

"The McKinnon rotary drier", the *Journal* tells us, "has long been regarded as an important accessory in large-scale cocoa drying operations. Its main function is to 'finish off' the drying process after the cocoa has received a limited period of drying in a hot-air drier of the natural ventilation type . . . much unwanted volatile acidity is taken out of (them) the cocoa beans".

Sills sounds a note of warning to processers in the use of the McKinnon drier. He states:

*(continued on page 74)*

# Search For A Parasite..(II)

*In this second and concluding instalment the author relates how he was finally successful in finding a parasite to control the coconut moth* Levuana iridescens, *which was seriously threatening the copra industry in the Fiji Group.*

By HUBERT W. SIMMONDS*

An adult Artona Catoxantha, a distant relative to the coconut moth Levuana iridescens. Magnification: approximately x7. Parasites on the former insect, found by the author in Malaya, proved an effective control for the latter in Fiji.

IN order to reach the New Hebrides from the Solomons, it was necessary for me to return to Sydney and proceed via Lord Howe and Norfolk Islands.

At the time of our visit to Lord Howe, it was suffering from a plague of rats which were destroying the main export crop, the seeds of a *Kentia* palm. The whole island was also over-run by the so-called asparagus fern, *Asparagus plumosa*.

From here we passed on to Norfolk Island. Ashore, fantailed flycatchers, grey warblers, crimson-breasted tits and purple-winged parrots reminded one of the fern gullies of Victoria, but the gigantic Norfolk Island pines were something unique. The island produces excellent oranges and strawberries.

### Search In The New Hebrides

Our next port was Vila, capital of the New Hebrides, where I spent two days before going on to the island of Epi. Here I transferred to an auxiliary schooner which traded through the northern part of the Group. I slept on deck, and the first night was one to remember. It was cloudless and absolutely calm, the stars brilliant above, while far away to the north the great volcano on Ambrym was in violent eruption. It looked like some vast forest fire through which there broke, with terrific explosions, great white-hot masses of lava hurled some thousands of feet into the air—a wonderful, awe-inspiring sight. On a previous eruption this volcano, the crater of which is a mile and a quarter across, had destroyed a mission and its hospital, many lives being lost.

Next day we moved on from Epi to Bushman's Bay on the island of Malakula. Subsequently we visited a number of islands, including Aoba, the Banks Group, and Santo. Whenever possible I continued my investigations, but without result.

The schooner then returned to Vila where, having finished my tour of the northern islands, I left it in order to join the mail steamer which worked the southern portion of the Group. I was quite sorry to make the change from the little ship. We had lived exceedingly well on her, carrying pigs, fowls and sheep for fresh meat, and obtaining fish and vegetables at the various places we called at. There was, however, a good deal of unwanted livestock aboard in the form of cockroaches, ants, copra bugs and an occasional scorpion.

On the mail boat our first call was at the island of Erromango, where we loaded wool. There was here a flock of ten thousand pure-bred merino sheep, which, despite the tropical nature of the island, seemed to do well. From here we went on to Tanna, an island which is interesting on account of its volcano, which gives a flash, like a lighthouse, at regular intervals. While ashore here I mentioned to a planter, whose estate I was walking through, that I was interested in the fact that a native had told me that he had seen a large blue and black butterfly, which theoretically should be present in this Group, but which had never been discovered, and asked whether he had ever seen anything of the kind. He replied that there had been one in his garden the day previously and added that it had had spoon-shaped tails. So there seems no doubt that there is some form of the magnificent *Papilio ulysses* still to be discovered, unless it has been found since that time.

So far as the search for the original home of the Fijian pest, *Levuana iridescens*, was concerned, I found no evidence to suggest that it had come from any of the islands of this Group, nor did I come across any closely-allied species from which we might hope to obtain parasites which would attack our insect. Nonetheless, I am still of the opinion that its original home was in one of these groups rather than those lying further north, an opinion greatly strengthened by the discovery in the Solomons by a colleague of what appeared to be a second species of the same genus. However, the matter is purely of academic interest, since our insect is now under very close biological control.

There was, however, another coconut moth which greatly interested me—a species of *Agonoxena* which I had found everywhere from Fiji to New Guinea. However, here it was absent from coconuts but present on sago, suggesting that it was originally a sago feeder and that, as other similar facts suggest, coconuts are a geologically recent introduction into the Pacific, and that this and other insects had moved over to them from some other local plant.

This is also supported by the fact that I once found a heavy attack of the leaf-mining beetle *Promecotheca reichei* attacking sago in Fiji, while adjoining coconuts upon which it can be a major pest were untouched.

While I was searching for the original home of our pest, my Chief in Fiji had been transferred, and his successor had engaged an Australian entomologist to go to Malaya, with an assistant, and obtain some of the parasites known to attack the distantly related moth *Artona catoxantha*. However, both attempts they made failed.

Meanwhile, in Fiji, the continued spread of the pest to fresh islands threatened the whole coconut industry

* Formerly Government Entomologist, Fiji.

A view of Port Vila in the New Hebrides Group, where the author searched in vain for traces of the coconut moth, in an endeavour to locate its original home.

of the Group, and a Committee was formed to arrange finance and take over the work of combating the menace. A senior entomologist was brought out from England with two assistants.

### Investigations In Malaya

After the failure mentioned above, I was instructed to proceed to Malaya and repeat the attempt. However, as there was no certainty that any of the parasites of the Malayan moth would attack our insect, it was arranged that one of the new entomologists should follow me a month later. If I had been able to obtain a shipment of the Malayan parasites, he would accompany them back to Fiji, but if none were available at the moment, he was to continue the search for the original home of our pest, trying Indo-China.

The journey to Malaya took us through Macassar and several Javanese ports. While at Tanjong Priok we took the opportunity to go up to Buitenzorg, to meet the officers of the Dutch Department of Agriculture, whose headquarters were situated there.

The moth *Artona catoxantha*, from which we hoped to obtain parasites for our pest, is normally a very rare insect in Malaya and Java. However, from time to time it appears in both as an extremely localized outbreak, but in immense numbers. When we reached Buitenzorg we were informed that no such outbreak was then known to be taking place, and we were advised to go on to Malaya.

On arrival at Kuala Lumpur, the capital of Malaya, we found that while there was no heavy outbreak of our moth at the time, there were one or two places where it could generally be found in small numbers, one being Batu Gajah (Elephant Rock), and we were advised to go there and study the position.

I was successful in finding a few specimens of the insect, sufficient to enable me to breed it out and become acquainted with some of its parasites.

Soon after this my colleague arrived, and a day or two later a Malay reported a major outbreak about twenty miles from Batu Gajah at a place called Kuala Dipang.

It now became necessary to make the arrangements for the collection and shipment of such parasites as might be present at this outbreak. To this end I had a number of cages constructed, large enough for a man to stand erect inside, and with a shelf to support six young coconut palms growing in petrol tins. The idea was to transfer the parasitised moth larvae on to these palms and transport them in this way to Fiji. Great assistance was given by the General Manager of the Malayan railways, who placed at our disposal a large luggage van to be attached to any train, all free of cost.

However, we soon found that the work of transferring the parasitised larvae to the caged palms was far too slow if we were going to catch the proposed steamer with a reasonable consignment. I therefore went into a nearby village and bought some big cases used to pack rubber and filled these with portions of coconut fronds with masses of the larvae, both parasitised and unparasitised, upon them.

The plan was that when my colleague was at sea, he should open the cases and move the parasitised larvae over to the growing palms in the cages. However, having placed the whole consignment in the luggage van, we found that the rubber cases did not shut closely enough, and many larvae escaped on to the walls of the van.

Fortunately I remembered that when I had been experimenting with these larvae at Batu Gajah, a box containing some had been upset. I had then discovered that they had what one might call a homing instinct, and had crossed the room to some coconut leaves I had placed on a table. We therefore took some of the clean palms from the cages and placed them against the walls of the car. It worked, and in a few hours all our precious caterpillars had moved on to the palms without our having touched them.

On arrival at Singapore I saw off my colleague and the consignment—which in due course reached Fiji in reasonably good order—while I returned to Kuala Lumpur to study the outbreak further.

### A Puzzling Gap

While we had been preparing the consignment of parasites for Fiji I had been struck by a most curious phenomenon in the life cycle of the moth *Artona catoxantha* from which we were obtaining our material.

This moth is normally an exceedingly scarce species, being an open feeder, where it is controlled by a number of enemies. However, from time to time it appears as an epidemic outbreak of the greatest intensity, but confined to a strictly circumscribed area. Within this area the palms will have their foliage completely destroyed, whilst thirty or forty yards away, not a single specimen of the pest will be found. The damaged area, however, gradually spreads outwards with each succeeding generation of the insect. Furthermore, in these outbreaks the vast numbers of parasites always present, not only fail to overcome the pest, but it actually seems to increase as the generations proceeded. After some months at this intense level, generally coinciding with the advent of the wet season, some new factor generally brings the outbreak to an end, although in the drier climate of Java this did not always occur, one such outbreak being reported as continuing for three years.

The outstanding feature about these outbreaks, however, was that despite the tens of thousands of larvae present, all would be in a relatively narrow margin as regards their development, i.e., if moths and eggs were present, third and fourth instar larvae and pupae would be absent, or, if these were present, eggs and adults would be absent. Further, while in the laboratory normally the moth took about thirty-five or so days to complete its life cycle, it was noticed that in the field it would be fifty or more days before the corresponding stage in the development of the larva reappeared.

These curious conditions continued as long as the outbreak lasted, the succeeding generations failing to link up and overlap as theoretically they should do in about three or four generations. In other words, there was a gap in the sequence of generations. It was as if one had visited a city and found only old people and children present, and had returned a few years later to find middle-aged people only, with no children or elderly folk.

These unusual conditions indicated that there was some major factor at work which not only created but also maintained the gap. Furthermore, it was also responsible for the fact that the vast numbers of parasites present failed to suppress the pest.

Of the numerous parasites present, one was easily the most numerous. It was a tachinid, *Ptychomyia remota.* I came to the conclusion that it was the peculiar incidence of this parasite which was the causal agency of these phenomena, the species being the one which we had just successfully landed in Fiji. This parasite was able to go through two generations to one of its host, while it required late third or early fourth instar larvae upon which to oviposit. This meant that from any one batch of moth eggs, both moths and parasites would emerge at approximately the same time.

Provided there were other larvae at the right stage available, the parasite would be able to use them and complete another generation by the time that the larvae from the original batch of eggs had reached a suitable size for it to use as its host, and this would be the normal course of events. If, however, there were no suitable larvae available from an earlier generation of moths, the parasite would either have to go elsewhere to look for an alternative host, or wait until the unparasitised larvae from its own generation of moth eggs had reached the required size.

This it was quite capable of doing, and in these outbreaks probably generally did so. However, they would then be so eager to oviposit that they emptied themselves upon the first moth larvae suitable and would have no eggs available for those caterpillars which were slightly delayed in their development. (This haste to oviposit was indicated by the fact that I once found seventy-two parasite eggs on a larva only capable of supporting one.)

The result of this would be that the first larvae of every generation of moths would be completely cut off, while the remainder would escape parasitisation entirely. In this way, once a slight gap had been formed, an epidemic outbreak would inevitably follow, with ever-increasing numbers of both host moth and parasite, the generations following at a later date than would normally be the case and the parasites never overtaking their host until some other factor, probably disease, came into force.

The theory thus put forward was not generally accepted by entomologists at the time, but subsequent events have shown that it was substantially correct, and thirty years later a small outbreak of *Levuana* which occurred in Fiji saw the parasite and the "gap" both present. In Java, in the three-year epidemic mentioned above, the "gap" was still maintained.

### Parasite Successfully Established In Fiji

By this time it had become evident that the tachinid parasite, *Ptychomyia remota,* which we had shipped from Malaya, was taking kindly to our pest, and that it was unlikely that any further introductions would be necessary. I received orders to return to Fiji.

The result of the introduction of this parasite was that *Levuana* became a thing of the past over most of its range, although several pockets of the pest remained for a year or two. These were mostly on islands, or—what amounted to the same thing—groups of palms entirely surrounded by sugar cane or open grassland, where there would be a limited insect fauna which could provide an alternative host for the parasite.

Since those days there have only been records of what is probably the same outbreak, along the banks of the Wainabuka River, and here there is the same well-marked gap in the sequence of generations, characteristic of the major outbreaks in Malaya and Java, suggesting that there is there also only a limited supply of alternative hosts.

Such, then, is the story of the long search; first for the original home of our pest, which could not be located, and then for parasites of the distantly-related Malayan species, which brought final and spectacular success.

---

## Young Fijian's Mountain Enterprise

In a project being carried out in the Fijian province of Ra, a young villager has organized youths of his age group into an industrious work force. They have built a large barracks of native materials high on the cloud-capped, reed-covered hills above their village. Under their vigorous leader they have, in the last few years, cultivated many acres of Yaqona (a root from which the Fijian kava is made) on the precipitous slopes. They work in the garden by day, sleep in the barracks by night and return to their village only at the week-ends.

The Burns Commission's report on Fiji's land and population problems, released last March, singles out this project for special commendation. "We consider this development, with its spirit and energy, to be an excellent example of Fijian enterprise and initiative, deserving of high praise."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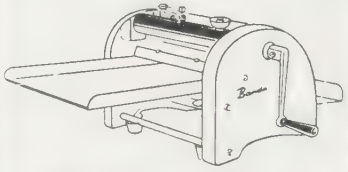

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A Papuan farmer on Rogeia Island, near Samarai, picking his first coffee crop. In the Pacific there is much scope for direct capital formation in the form of planting of trees and vines from which cash crops can be derived.

# Agricultural Credit In Economically Under-Developed Countries

*With the above title, a study by Professor Horace Belshaw of the use of agricultural credit to promote economic development has just been published by the Food and Agriculture Organization, Rome. It is reviewed below by . . .*

R. H. BOYAN*

"THIS study is concerned with the use of agricultural credit to promote economic development, and more particularly, as a part of this general objective, to increase agricultural output and improve the economic well-being of rural populations." Such is the wording of the opening paragraph of the author's Foreword to his book.

The study covers the world in general, with particular reference to Asia. The author states that the concern is with peasant farming, and the text indicates that the peasant is living at a standard little above bare-subsistence, dependent mainly on a seasonal crop and in many cases beset with a burden of debt from which he is unable to extricate himself. Under these circumstances the author states that ". . . the problem of promoting economic development is posed in terms of breaking the cycle of low incomes, low savings, low capital formation, low income."

This review will be largely concerned with the applicability of the contents of the book to the Pacific and, in particular, from the point of view of those who are concerned with the place of co-operatives in relation to economic and social advancement.

The circumstances of the peasant as stated above do not appear to be typical of the Pacific, where usually there is not dependence on one seasonal crop. As Professor Belshaw himself points out, this alters the picture.

He mentions a paper on Indonesia by Professor E. de Vries reporting on a survey designed to discover why farmers in a particular area did not demand credit, while those in other areas did. Those surveyed did not need credit because they were able to grow a good secondary crop which tided them over till proceeds from the main crop came in. He also mentions a report from Malaya which showed that the rubber planter who had a regular income from tappings needed very little credit for working expenses, though he might demand medium-term credit for ceremonial expenditure, house repairs or land improvement.

It would seem, therefore, that the Pacific Islander has no great need for short-term credit. Furthermore, except where there is extreme pressure of population on land resources, it would seem that the average Pacific Islander has the resources to produce enough for subsistence and provide a surplus to sell for cash which can be spent on extra consumer goods or used for capital formation. The Pacific problem of economic development is surely largely one of avoiding waste of land and labour resources, assistance with marketing (including transport), processing and other services, and providing facilities for savings and their mobilization.

However, short-term credit may be necessary to meet emergency circumstances such as funerals, marriages, births and unexpected events. The meeting of such events in the Pacific is surely a matter for thrift rather than credit; thrift and credit societies or credit unions deriving their funds solely from members should be the answer where this problem exists.

### Scope For Medium-Term Credit In Papua

The Pacific problem of economic development mentioned above does indicate scope for medium-term credit; thus the comments of the author on medium-term credit are relevant to the Pacific. It is intended, therefore, briefly to summarize the main points he appears to make. Before this is done, however, some reference must be made

* Co-operatives Officer, South Pacific Commission

to long-term credit. Normally this appears to be needed for land purchase, with the land itself as security. This would appear to have limited application in the Pacific.

We may now turn to the main points made by the author:

> "While much may be learned from agricultural credit systems in developed countries, it is inviting failure to apply these experiences uncritically without modification—sometimes substantial—to very different peasant societies."
>
> ". . . more is likely to be gained through innumerable small accretions in productive power by relatively simple improvements closely related to what has been found before to be acceptable, than by leaping forward into new technologies."

These remarks should not be construed as opposition to capital investment in processing and transport facilities and warehouses because such measures are also advocated by the author. Associated with this principle is a further one that where land is relatively scarce, preference should be given to labour-intensive methods, i.e., those which increase output per head without necessarily economizing in labour; a policy of seeking the same production from the same land with less labour raises a problem of employment of the redundant workers.

The author goes on to point out that where land is abundant, more emphasis may be placed on increasing the area of land farmed per unit of labour. This focuses attention on capital formation by direct labour. The author says—"trees may represent a small financial investment for a large return because family labour can be used", and gives some attention to the direct use of labour in capital formation but confines his discussion to the collective use of rural labour for local capital works.

It does seem, however, that in the Pacific there is much scope for direct capital formation, in the form of planting of trees and vines from which cash crops can be derived, e.g., coconuts, cacao, coffee, tea, pepper, etc., which will substantially increase incomes and largely avoid the need for external credit. Lack of specific economic anthropological knowledge regarding productive capacity limits accurate assessment of the potential, but the development of native-owned cocoa groves in the Gazelle Peninsula and other parts of Papua and New Guinea, of native-owned coffee trees and passion fruit vines in the New Guinea Highlands, and of banana and cocoa plantings in Western Samoa, all without the benefit of rural credit, are indications of the potential in this direction.

Trees can only be planted if land is available and Professor Belshaw points out that capacity and incentive to pro-


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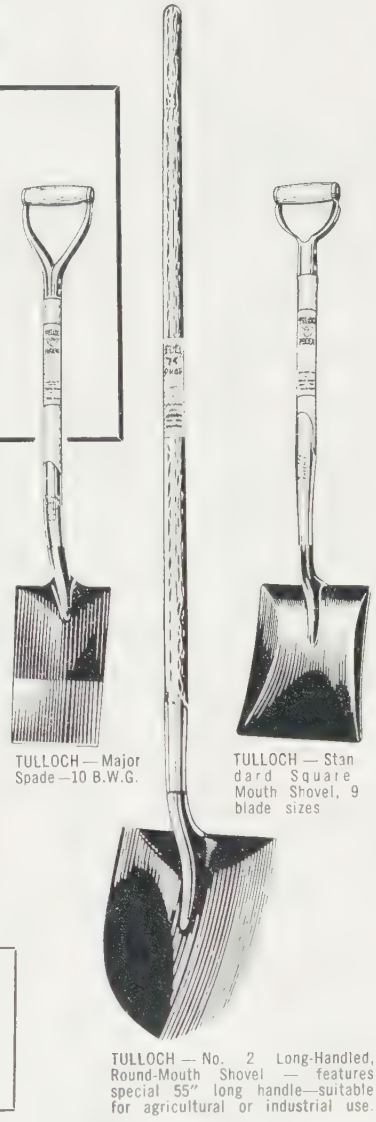

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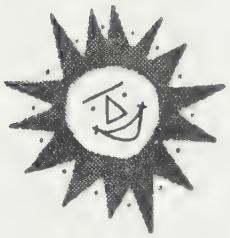

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duce will often be increased by land reform. He goes so far as to say that for a credit policy to be effective, such reform may be necessary and, conversely, improved credit facilities may be necessary if land reforms are to succeed.

When loans are granted the author considers that interest rates should be kept as close as possible to the practicable minimum. He also expresses the view that material possessions should not be sought as security, but emphasis should be on credit-worthiness as judged by character and growing crops.

There is a need to eliminate risk as far as possible and to make provision to meet losses where they are inevitable. One important means of doing so is linked up with what is perhaps the main point made by the author, namely, the need to integrate credit with marketing and supply.

This is in line with the recommendations of the All-India Credit Survey, which were incorporated into India's Second Five-year Plan.

The implementation of such integration may involve the improvement of existing agencies for credit, marketing and the provision of supplies or the establishment of new organizations for these purposes. In addition, the better functioning of rural societies will also require other new types of organization, such as statutory local government authorities, village development councils, and functional groups such as farmers' associations or co-operative societies.

### Important Role For Governments

The author says that governments must play a large role in the use of credit to promote agricultural development. This may take many aspects, e.g., the provision of "social overhead" in the form of roads, public utilities (communications and power, etc.), the spread of literacy and formal education, agricultural extension services, co-operative education and training, marketing information, the establishment of a suitable overall climate for private investment, encouraging private investment in agriculture, the setting-up, if necessary, of credit institutions essential to the implementation of a scheme of rural credit and, if necessary, supervision of such institutions.

The possible forms of organization whereby credit may be extended more fully to rural areas is discussed in detail, with examples from various countries. An interesting reference is made to Turkey where it is reported the Agricultural Bank of Turkey selects and trains the managers of co-operative credit societies and inspects and supervises the operations of the societies.

Mention is also made of the functions and operations of the Agriculture and Credit Financing Administration of the Philippines. In addition, the system in

use in Japan comes in for commendatory mention.

While government is pictured as playing an important role in the setting up of the rural credit system, the author does draw attention to the desirability that government policy should be directed towards facilitating the emergence of the peoples' own organizations and own leaders, rather than simply doing things for the people. He goes on to say ". . . and that suitable administrative structure be devised for this purpose and to provide for the necessary co-ordination among various departments or agencies of government."

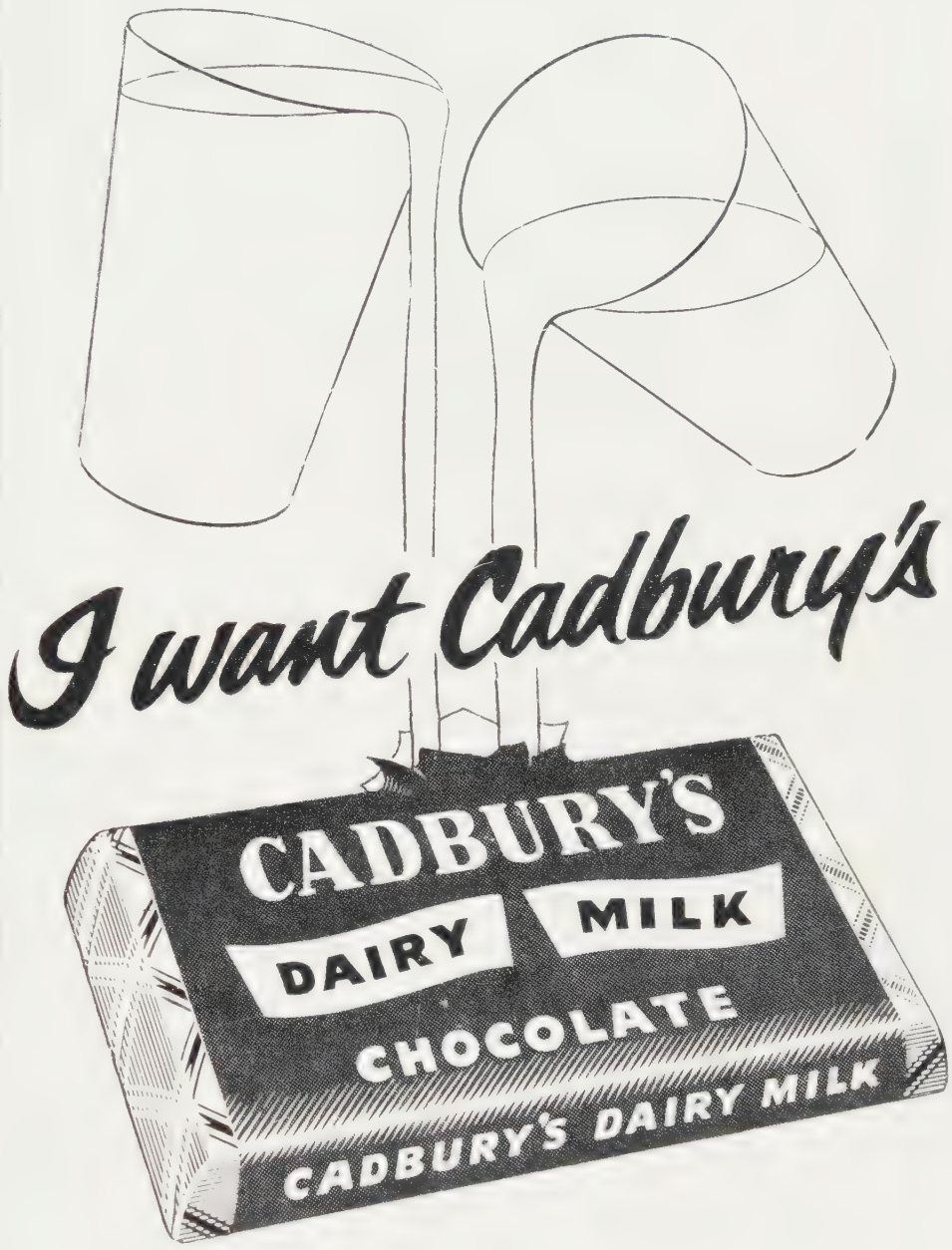
It is pointed out that credit institutions sometimes operate their own extension services, sometimes making the granting of credit conditional on accepting this advice. In this connexion it is interesting to recall that the Trust Territory of the Pacific Islands has a subsidy scheme in connexion with cocoa planting under which entitlement to the subsidy is dependent on following the advice of the extension officers.

The author gives some attention to the matter of government co-partnership, i.e., where government contributes the share capital of credit institutions, and, in particular, co-operative credit organizations and also shares in management until such time as the government shares are bought out.

The author lays stress on the need for decentralization in the rural credit policy, and brings in the advantages of the co-operative approach, using the following words:

> "When a community is ready, the co-operative approach, combining thrift and credit and linking credit with marketing, is the ideal to be aimed at. For this reason, it is desirable, as early as practicable, to link associations of borrowers with a central institution as a means of decentralizing its operations, where this is possible, using them as the channel for loans, and, as soon as practicable, converting them into co-operative societies."

Co-operatives are mentioned at various places in the text, and in addition two Parts are headed *Aspects of Co-operative Organization* and *Co-operative Credit*. These Parts contain a sound critical analysis of co-operatives in general, and credit co-operatives in particular. While the author says that "care must be taken not to neglect such other forms of organization to promote action in pursuit of common interests, or assume that co-operative societies are necessarily superior to other arrangements in all communities or for any particular purpose", he does express approbation of co-operatives as an important factor in economic and social progress. This is well-expressed in the following words:

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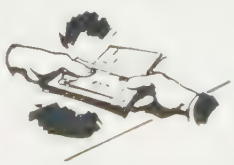

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"Nevertheless, ideally, the co-operative society is a method of organization possessing important advantages, both social and economic, over most other forms, especially because it provides a systematic way of promoting self help and mutual help. These advantages are such that rather than react to the disappointments and difficulties by defeatism, means should be sought to overcome the obstacles, and to establish a co-operative structure providing strong foundations in rural communities for sound credit, marketing and processing systems. This requires an assessment of problems and needs in each separate country, and a re-examination of traditional conceptions as to how co-operative principles may best be applied."

The benefits to be derived from the co-operative approach are well set out in more detail, as are the difficulties and obstacles that co-operatives face. He also refers to the differences between potentialities and achievements of co-operatives and resulting therefrom the development of heterodox ideas by some of those concerned with field experience of co-operatives. The author himself suggests there are circumstances where a quasi-co-operative form of organization may properly be used as a transitional approach. Specific mention is made of government co-partnership as mentioned earlier, and quasi-co-operatives in which traditional leaders were the controllers.

### Supervised Credit

Following the discussion on co-operatives, the author devotes a Part to supervised credit, which is represented as a broad, closely-supervised programme of rural self-improvement of which credit is a part, differing from community development schemes in the special emphasis laid on credit aspects and the greater relative concentration on the individual farmer and his family. Supervised credit is described as expensive, and the author considers it should be a transitional stage.

The final Part of the book preceding the consolidation of conclusions deals with ways in which reserve banks can act as leaders in the economic development of a country.

## Cocoa And Coffee Exports From Papua And New Guinea

In 1958-59, 4,253 tons of cocoa valued at £1,491,847, and 969 tons of coffee valued at £456,037, were exported from Papua and New Guinea, representing an increase over the 1954-55 export of these commodities of 3,147 tons of cocoa and 862 tons of coffee.

Australia is the main buyer of both cocoa and coffee from the territory, the balance going to the United Kingdom, Germany, the Netherlands, Japan (cocoa only) and Hongkong (coffee only).

# PACIFIC READING

*Material in this section is contributed by the South Pacific Commission Literature Bureau. Any enquiries relating thereto should be directed to* Box 5254, G.P.O., Sydney, Australia.

## Notes and News

### Literature Bureau Publications

A First Primer. Printed in the Blanche Bay dialect by the South Pacific Commission Literature Bureau on behalf of the Methodist Overseas Missions, this 36-page reader was written and prepared by Mrs. J. Poole in conjunction with Dr. Frank Laubach. The book contains five lessons arranged in four columns. Line drawings of familiar local objects which are associated with basic sounds form the approach to reading. Each lesson contains simple sentences to follow the sounds and words learned in the first part of the lesson.

The illustrations were done by Nina Murphy. A limp pale blue cover with maroon lettering completes a useful vernacular production.

A Gilbertese Grammar. This is a reprint of the book published by the London Mission Press in 1949. It is a small pocket-sized book of 64 pages.

Piakirikiri Pati Tusi Kerua. This Primer in Ngunese language was produced on behalf of the Pacific Christian Literature Society by the Bureau. It was compiled by Miss J. I. Trudinger, translated by Rev. R. W. Murray and other local helpers, and prepared finally by Miss A. Riach, for the Presbyterian Church of the New Hebrides. The method follows a question-and-answer pattern, each sentence being accompanied by a line drawing of the local object concerned.

19 pages in a pale blue cover with maroon lettering make an attractive and helpful book.

Wealth from the Coconut (*Tahitian version*). This is the thirteenth version of this popular little book, written originally by W. V. D. Pieris. The title is "Te Niu e to'na mau hotu", the translation being by M. T. Iorss.

Stocks of the original version in English are still available at 3/2 (Aust.) and 2/6 (stg.).

Readers requiring further information on any of the above four books are invited to write to the South Pacific Commission Literature Bureau, Box 5254 G.P.O., Sydney, Australia.

### In Preparation for Future Production.

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Following on the success of *Let's Grow Peanuts*, which was printed in three versions, English, Pidgin and Motu, the Agriculture Department of Papua and New Guinea has planned production of the above titles in the same three languages.

A Health Game For Papua. The author of this novel production is Lois Niall, an energetic Women's Welfare Officer of the Department of Native Affairs, Papua and New


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OUR PACIFIC : BOOK ONE — THE OCEAN. This is the first of a series of four books. Book I is now being printed in a pilot edition large enough for distribution to the various territories within the South Pacific Commission's area, to ascertain suitability and potential demand.

The request for such Pacific Readers was made by the delegates at the Third South Pacific Conference. Initially, very little progress was made but during the last year much co-operation and enthusiasm have been displayed by various territories. Drafts have been tested in widely-different areas among pupils of the 12-15 years age groups, to ensure that the language level is right. An attempt has been made to make the text simple enough for islanders to read it in their homes without the help of a teacher. Every chapter is illustrated with black and white photographs.

It is intended to distribute the texts of Books 2, 3 and 4 without illustrations for the information of territorial administrations. All are ready. Printing will depend on demand.

## New Books For The Pacific

ISLANDS OF THE PACIFIC by A. W. Reed. A. H. & A. W. Reed, Wellington, New Zealand. 32 pages, illustrated (black and white). N.Z. 6/6.

Both author and publishers are well known for their books on the New Zealand Maori. This is a school child's book probably written for the New Zealand school pupil to give him a general picture of the Pacific Islands world.

Each chapter comprises one page, with black and white drawings by Conrad Friebae on the opposite page. In spite of its brevity each chapter gives a clear general description of a phase in Pacific history.

TRUST TERRITORY OF THE PACIFIC ISLANDS (A HANDBOOK OF INFORMATION) prepared by the High Commissioner of the Trust Territory of the Pacific Islands, the Hon. D. H. Nucker, and staff. 1959. 82 pages, illustrated.

The first seven pages of this handbook are devoted to a general description of the whole Trust Territory area, covering natural phenomena, people, language, history, and present administration organisation. In the following pages a chapter is devoted to each of the seven districts—Palau, Yap, Saipan, Rota, Truk, Ponape, and Marshall Islands. Each chapter is prefaced by a full-page map of the district, and is subdivided into a number of sections, each clearly and adequately titled.

The line drawings are large and impressive, and a few photographs add much human interest.

ACTIVITIES AND GAMES FOR TROPICAL SCHOOLS by Edith R. Clarke. Macmillan & Co. Ltd. 119 pages, illustrated. A.10/6.

Although compiled for Tanganyika, this book is more or less universal in its application. Pacific Island teachers will find it describes a variety of enjoyable and simple games for children. The simple equipment suggested could be made from local materials found near any "bush" or "island" school. Illustrations are used profusely to clarify the brief descriptions.

MY HOME IN FIJI by Isabel Crombie. Longmans. 17 pages, illustrated in colour. S.1/-.

This book is No. 11 in the MY HOME Series. The colourful illustrations are excellent, and the type face and language are both attractive and suitable for primary school Pacific islanders. It is remarkable that such a book can be sold so cheaply.

ALL THE PROUD TRIBESMEN by Kylie Tennant. Macmillan & Co. 159 pages, illustrated. A.11/6.

This neat board-covered book for youthful readers contains a story set in the smaller volcanic islands off the coast of New Guinea. The setting and details will be familiar to islanders, who with six to eight years of English will be able to cope with the text.

Many island characters play important roles in a story which revolves around Miss Buchanan, a lone school teacher, and a widowed doctor and father, Dr. Mason. Miss Buchanan and her islanders are forced to flee in row boats to escape a major volcanic eruption. They land on Dr. Mason's island only to find that the hermit doctor and his daughter, quite unbeknown to themselves, have become the victims of a native sorcerer.

VILLAGE LIFE IN FIJI by R. R. Nayacakalou. (Series: ABOUT THE PACIFIC). Schools Publication Branch, Department of Education, Wellington, New Zealand. 39 pages, illustrated. N.Z.1/6.

This addition to their already numerous and popular productions brings the New Zealand Publications Branch further into the Pacific. Written by a Fijian who is a lecturer in anthropology at the University of Auckland, the book is both restrained and informative. The daily activities of the average modern Fijian villager are described with simplicity and accuracy not always found in such books.

The photographs have been well chosen to support the text. Under 18 chapter headings ranging from *Geography, History, People, Livelihood,* and *The Future,* the adult or post-primary reader will find a clear condensed picture of a Fijian's life today.

ART & CRAFT FOR THE SOUTH PACIFIC by Gordon Tovey. Island Education Division, Department of Education, New Zealand, for Department of Island Territories. 67 pages, illustrated.

This is a book designed to assist and encourage teachers who are afraid to tackle the teaching of Art and Crafts because they themselves lack such skills. Its methods and schemes could be applied to any area of the Pacific, and may be found most useful not only in schoolrooms but in youth organisations and women's clubs.

The scheme explains how art may still be creative while using the traditional forms. It clearly defines the areas to be covered by each of the four age groups.

The author, assisted by several Pacific students who have studied under him, has given us a comprehensive scheme which should appeal to both teachers and pupils.

SOUTH SEAS MAGIC by Ronald Rose. Robert Hale Ltd. 192 pages, illustrated. A.18/-.

The author and his wife spent some nine months among the Samoans on small Manono Island, their community being chosen as one least affected by modern changes.

The prime motive for such a visit was to study Polynesian superstitions, magic, sorcery, "spirit-sickness", and form of psychical healing. These fields of mental activity are covered by the author under the term para-psychology. The book reveals a much broader view of Samoan village life, both interesting and intimate in its many aspects. Most of us are aware of the immense powers wielded by the witch doctor in primitive societies, with their widely-held belief in the influence of the spirit world on their everyday life. As a result of his studies, the author thinks that such powers are still prevailing, in spite of the obvious—but what he terms superficial—influence of the missions.

Previous similar surveys among Australian aborigines and New Zealand Maoris, together with a generous grant from the Parapsychology Foundation of New York, made it possible for the author to produce this record of his impressions of Manono.

SOUTH PACIFIC ENTERPISE : THE COLONIAL SUGAR REFINING COMPANY LIMITED edited by A. G. Lowndes. Angus and Robertson. 500 pages, illustrated. A.42/-.

Mr. A. G. Lowndes was initially engaged by the Colonial Sugar Refining Company to write the chapter on Fiji, and as a result was given the task of editing the complete volume, which covers the Company's activities from its birth in 1855.

The present success of the operations in Australia, New Zealand and Fiji, after the earlier setbacks and difficulties, is the result of courage, foresight and good public relations.

It is interesting to note that many of the strains of sugar-cane now grown commercially in Australia and Fiji were originally provided from stock brought from the native gardeners of New Guinea.

The chapter on Fiji will provide much useful background material for those wishing to understand the social and political life in present-day multi-racial Fiji. Charts, graphs, maps, line drawings and photographs help to give much valuable scientific and historical information.


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## Training Course For Women's Club Leaders In Papua And New Guinea

*(continued from page 32)*

living in an environment related to their own surroundings.

RECREATION: Basketball was taught during the Course. This has proved to be the most popular sport among women and is easily learnt by them. At the end of the week a mixed European team played a team chosen from the women attending the Course.

### An Encouraging Response

The Course concluded with a ceremony at which all participants were presented with certificates by the District Commissioner. Later a light-hearted party put the finishing touches to their new experience.

The response to the idea of such a Course was evidenced during the two days prior to the opening, when thirty-two instead of the anticipated twenty-four women appeared to take part.

The response to the Course itself was very gratifying. It was found necessary to have frequent changes of activities, as none of the women was used to concentrating for a long period on any one topic.

Towards the end of the Course, more pertinent questions were raised by the women themselves. From nearly every village the women spoke of the difficulties they had encountered because of opposition from the men and older women. These were discussed, and various suggestions were made to counteract this attitude. (One was to concentrate on cooking for a month or so in Club meetings, to gain the interest and support of the men).

Reports from interested Europeans in the area have stated that the women who took part in the Course have returned with heightened enthusiasm, and in some cases have started teaching some of the things they had learnt.

However, it will only be possible to make a true assessment of the lasting value of such a Course after a follow-up in two or three months' time, when a visit will be made to the villages from which the women came.

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## Tourism—Fiji's New Industry

*(continued from page 37)*

eight days, and has proved a magnet to attract visitors. One cruise ship stayed last year for three days of the Festival, and the same company is sending another cruise ship for this year's Festival for a five-day stay. (This year's Festival dates are October 8 to 15).

An increasing number of travel agencies in Australia and the United States are including Fiji in what are known as Pacific "package" tours. These embrace visits to a series of Pacific Islands.

### Government Encouraging Industry

The Government is encouraging expansion of the tourist industry by subsidising the Fiji Visitors' Bureau to the extent of nearly £10,000 a year, and by providing help financially and in tax concessions for hotel investments.

Publicity for the tourist industry covers a wide variety of channels. Suva City Council has co-operated under the leadership of its tourist-minded Mayor, Councillor C. A. Stinson, in beautifying the city and its surroundings with luxurious tropical flowers and shrubs. A memorable sight is Fiji's scarlet tulip trees with their bright green foliage set against the vivid blue of a tropical sky.

Endeavours are being made to give outlying islands of the Colony a share of the tourist trade, but distances and a shortage of adequate transport makes this difficult, except for the tourist who can spend weeks in Fiji.

Lastly, the sport of big-game fishing in Fiji waters is being developed as an added attraction for tourists.

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## The Cocoa Industry In Fiji

*(continued from page 62)*

"It is not possible to dry wet cocoa —taken straight out of the fermentary —in an unmodified McKinnon drier, since the perforations in the walls of the drum quickly clog up with the pulp residues from the wet beans".

### Pests And Diseases

INSECT PESTS OF COCOA, by B. A. O'Connor, and DISEASES OF COCOA, by L. W. Harwood, are two useful articles for reference. The pests described, such as the Rose Beetle, Aphids, Mealy-bugs and the Fig Moth are unfortunately found in almost all the cocoa-growing countries of the Pacific region, while Black Pod, Fomes root diseases and Pink Disease are problems known to cocoa planters everywhere. Notes making their recognition easy, and measures to be taken for their control, are given in each case.

### Cocoa Nutrition

COCOA NUTRITION is the title of an article contributed by J. W. McPaul. Unfortunately there is not sufficient space to quote extensively from it, but as an explanation to planters of the natural process of maintaining soil fertility the following extract is given:

"The continuous supply of leaf mould is one of nature's ways of keeping a soil fertile. In the absence of this supply soil fertility rapidly deteriorates in a tropical climate. The reason is that in a hot, wet climate, rock minerals, which are the original source of all the mineral foods of plants, are rapidly decomposed and, as the nutrients are released, they are subject to leaching by heavy rains. Forest trees, which have deep, extensive roots, are able to offset this loss. They absorb the minerals as they are released and can also retrieve those which are too deep down in the soil for the smaller plants; these minerals are then transported to the leaves. When the leaves are shed and decompose the absorbed nutrients are again released into the surface soil and again become available to the trees, thus maintaining a 'nutrient cycle'. Such a cycle, however, is not able to provide nutrients which are originally absent from the soil and it is here that artificial fertilizers are necessary".

### CONTRIBUTORS

Contributors to the Cocoa Issue of the *Agricultural Journal* published by the Department of Agriculture, Fiji, were:

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## Housing And Home Improvement In The Caribbean

*Housing and Home Improvement in the Caribbean*, by Elsa Haglund, published by the Food and Agriculture Organization and the Caribbean Commission, 1958, 220 pages (no price given).

ALTHOUGH this book has been written for use in the West Indies, its contents will be of direct interest to people living in the South Pacific. This is the second volume in the series on Home Economics, published jointly by the Food and Agriculture Organization and the Caribbean Commission.

As was the case with the first Volume, which was entitled *Economics and Family Life in the Caribbean*, the book is intended as a textbook for teachers and social leaders. The intention is to show the essential requirements for a modest home—the home of the ordinary, not very well-off, person—with the emphasis on self-help.

Suggested house plans are given, together with detailed building instructions. This is followed by interesting suggestions for equipping and furnishing the home, including hints on woodwork. The care of the house is covered, and there are instructions on domestic hygiene, refuse disposal, and insect and rat destruction. The construction and use of hygienic latrines are dealt with in some detail.

This book should prove to be of great interest to the amateur home-maker anywhere in the tropical world.

# South Pacific Commission Technical Papers

Copies of Technical Papers, which are published both in English and French editions, may be procured from the South Pacific Commission, Nouméa, New Caledonia, or G.P.O. Box 5254, Sydney, Australia. Except where otherwise stated, price per copy, post free by surface mail, is 2/- stg. (2/6 Aust., 2/3 Fijian, 30 cents U.S., 1 New Guinea guilder)*.

## NUTRITION

18. **Report on Nutrition Investigations by the South Pacific Commission in 1950.** November 1951.
23. **Nutrition Research Conducted in New Hebrides during 1951.** Sheila Malcolm, nutritionist, South Pacific Commission. April 1952.
50. **Nutrition Investigation in New Caledonia.** Sheila Malcolm. October 1953.
63. **Diet and Nutrition in American Samoa.** Sheila Malcolm. August 1954.
83. **Diet and Nutrition in the Trust Territory of the Pacific Islands.** Sheila Malcolm. July 1955.
85. **Etudes sur la Nutrition et l'Alimentation dans les Etablissements Francais de l'Oceanie** (Summary and Conclusion in English). Sheila Malcolm. April 1955.
95. **Bibliography of the Nutritional Aspects of the Coconut** (revised edition of T.P. 58). F. E. Peters. September 1956.
100. **Chemical Composition of South Pacific Foods**—An Annotated Bibliography. F. E. Peters. January 1957. (6/- stg., 7/6A., 6/9F., $0.90, 3G.)
106. **Some Food Problems In The Pacific Islands.** H. S. McKee. May 1957.
113. **The Diet of Mothers and Children on the Island of Guam.** Sheila Malcolm. January 1958.
115. **The Chemical Composition of South Pacific Foods.** F. E. Peters. January 1958.
118. **Nutrition and the Papuan Child.** H. A. P. C. Oomen and S. H. Malcolm. April 1958. (8/- stg., 10/-A., 9/-F., $1.20, 4G.)

## PUBLIC HEALTH

12. **Tuberculosis Investigations by the South Pacific Commission in 1950.** May 1951.
24. **A Survey of Leprosy on the Island of Nauru.** Dr. C. J. Austin, Director, Makogai Leprosy Hospital, Fiji. April 1952.
27. **A Survey of Leprosy in the British Solomon Islands Protectorate.** Dr. C. J. Austin. July 1952.
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96. **Health Education In The South Pacific.** G. Loison and L. L. Keyes. September 1956.

## MOSQUITO-BORNE DISEASES

17. **Conference of Experts on Filariasis and Elephantiasis, Tahiti: Summary of Proceedings.** September 1951.
33. **A Survey of Malaria in the British Solomon Islands Protectorate.** Dr. R. H. Black, School of Public Health and Tropical Medicine, University of Sydney. November 1952.
60. **Some Aspects of Malaria in the New Hebrides.** Dr. R. H. Black. May 1954.
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88. **Annotated Bibliography of Filariasis and Elephantiasis. Part 2.** Dr. M. O. T. Iyengar. Jan. 1956. (6/- stg., 7/6A., 6/9F., $0.90, 3G.)
104. **Developmental Stages Of Filariae In Mosquitoes.** Dr. M. O. T. Iyengar. May 1957.
105. **An Investigation On Filariasis In The Berau Region.** H. de Rook. May 1957.
109. **Annotated Bibliography of Filariasis and Elephantiasis. Part 3.** Dr. M. O. T. Iyengar. July 1957. (6/- stg., 7/6A., 6/9F., $0.90, 3G.)
110. **Enquete epidemiologique et entomologique sur la Filariose de Bancroft en Nouvelle-Caledonie et dependances.** M. Lacour et J. Rageau. (With Summary in English). August 1957.
117. **La repartition geographique des moustiques en Nouvelle-Caledonie et dependances.** J. Rageau. Mars 1958. (Available in French only).
119. **Enquete entomologique sur le Paludisme aux Nouvelles-Hebrides.** Jean Rageau et Guy Vervent. Janvier 1959. Available in French only. (25 francs CFP.)
124. **Annotated Bibliography of Filariasis and Elephantiasis. Part 4. Treatment.** Dr. M. O. T. Iyengar. August 1959. (6/- stg., 7/6A., 6/9F., $0.90, 3G.)
125. **Studies On The Epidemiology Of Filariasis On Central And South Pacific Islands.** Elon E. Byrd and Lyle S. St. Amant. September 1959. (6/- stg., 7/6A., 6/9F., $0.90, 3G.)
126. **A Review of the Literature on the Distribution and Epidemiology of Filariasis in the South Pacific Region.** Dr. M. O. T. Iyengar. October 1959. (6/- stg., 7/6A., 6/9F., $0.90, 3G.)
129. **Annotated Bibliography of Filariasis and Elephantiasis.** Part 5. Dr. M. O. T. Iyengar. June 1960. (6/- stg., 7/6A., 6/9F., $0.90, 3G.)

## TROPICAL CROPS

31. **Cocoa Plantation Management in Western Samoa.** D. R. A. Eden, General Manager, New Zealand Reparation Estates, and W. L. Edwards, Assistant General Manager. October 1952.
36. **Cocoa Growing in Fiji Islands.** D. H. Urquhart, former Director of Agriculture, Gold Coast. December 1952.
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## PESTS AND DISEASES OF PLANTS AND ANIMALS

9. **Report of Plant and Animal Quarantine Conference, Suva.** April 1951.
34. **Rhinoceros Beetle Control in the Kingdom of Tonga.** L. J. Dumbleton, Plant and Animal Quarantine Officer, South Pacific Commission. November 1952.
77. **A List of Diseases and Parasites of Animals Recorded in the South Pacific Territories.** Bilingual. December 1954.
78. **A List of Plant Diseases Recorded in South Pacific Territories.** Bilingual. December 1954.
79. **A List of Insect Pests Recorded in South Pacific Territories.** Bilingual. August 1955. (6/- stg., 7/6A., 6/9F., $0.90, 3G.)
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107. **The Rhinoceros Beetle In Western Samoa.** R. A. Cumber. June 1957. (4/- stg., 5/-A., 4/6F., $0.60, 2G.)
128. **Diseases and Biological Control in Rhinoceros Beetles.** Paul Surany. March 1960. (6/- stg., 7/6A., 6/9F., $0.90, 3G.)

## ECONOMIC CONDITIONS

54. **The Pacific Islander and Modern Commerce.** V. D. Stace, Assistant Economist, Reserve Bank of New Zealand. March 1954.
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## CURRENT RESEARCH

29. **Current Research in the South Pacific in the Field of Economic Development.** July 1952.

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98. **Social Science Research In The Pacific Islands.** November 1956. (4/- stg., 5/-A., 4/6F., $0.60, 2G.)
102. **Index Of Social Science Research Theses On The South Pacific.** April 1957. (4/- stg., 5/-A., 4/6F., $0.60, 2G.)
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## CO-OPERATIVES

42. **The Co-operative Movement in Papua and New Guinea.** Prepared by the Registry of Co-operative Societies, Port Moresby. February 1953.
120. **A Guide to the Marketing of Copra in Primary Co-operative Societies.** C. G. Joannides. January 1959.
121. **Catalogue of the S.P.C. Co-operative Library.** January 1959. (Revised edition of T.P. 75.) (5/- stg., 6/3A., 5/6F., $0.75, 2.50G.)
123. **Co-operatives in the South Pacific.** (Report of the SPC Technical Meeting on Co-operatives held at Port Moresby July 21-August 1, 1958.) February 1959.

## COMMUNITY DEVELOPMENT

11. **Interim Reports on the Moturiki (Fiji) Community Development Project.** Howard Hayden, Director of Education, Fiji. May 1951.
26. **Further Education in the Cook Islands.** P. F. Henderson, Officer for Further Education, Cook Islands. July 1952.
35. **The Purari Delta—Background and Progress of Community Development.** November 1952.
45. **The Nimboran Community Development Project.** Dr. J. van Baal, Director of the Bureau of Native Affairs, Netherlands New Guinea. June 1953.
46. **The Koror Community Centre.** Reports supplied by the High Commissioner, Trust Territory of the Pacific Islands. August 1953.
74. **Educational Aspects of Community Development.** R. Thomson, January 1955. (4/- stg., 5/-A., 4/6F., $0.60, 2G.)
84. **The Communities Project Approach to Economic Development.** H. Belshaw. July 1955.

## EDUCATION

3. **The Village Library.** April 1950.
14. **Educational Broadcasts to Samoan Village Schools.** Department of Education, Western Samoa. May 1951.
15. **Libraries for Beginners.** Dr. and Mrs. Kenneth Todd, Kwato Mission, Eastern Papua. July 1951.
32. **Types of Organization in Adult and Mass Literacy Work.** D. B. Roberts, Organizer of Island Literature, South Pacific Commission. August 1952.
47. **Central Vocational Training Institution.** F. J. Harlow. August 1953. 5/- stg.; plans available sep. (5/- stg., 6/3A., 5/6F., $0.75, 2.50G.)
72. **Literacy Teaching for Adults.** Karel Neijs. November 1954. (5/- stg.)
73. **Educational Evaluation—A Documentary Survey.** J. C. Nield. December 1954.
99. **Education In The Pacific Islands—A Selective Bibliography.** C. Wedgwood. November 1956. (6/- stg., 7/6A., 6/9F., $0.90, 3G.)
114. **An Experimental Course in Adult Literacy.** Karel Neijs. January 1958.

## OTHER SUBJECTS

6. **A Preliminary List of Economic Plants of New Caledonia.** J. Barrau, Director of Agriculture, New Caledonia. July 1950.
7. **A Preliminary List of Plants Introduced into Tahiti.** July 1950.
25. **Report of Fisheries Conference, Noumea.** May 1952.
28. **Coral as a Building Material.** July 1952.
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41. **Social Problems of Non-Maori Polynesians in New Zealand.** Rev. R. L. Challis, Pastor of the Pacific Islanders' Congregational Church in New Zealand. February 1953.
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53. **Reclamation of Tidal Mud Flats in Tonga.** W. Straatmans, Head of the Department of Agriculture, Nuku'alofa, Tonga. March 1954.
70. **A Linguistic Survey of the South-Western Pacific.** Dr. A. Capell. November 1954. (20/- stg., 25/-A., 22/6F., $3.00, 10G.)
76. **A Bibliography of Tropical Housing.** January 1955.
103. **How to Make Your Own Posters.** Nancy Phelan. May 1957. (2/6 stg., 3/3A., 2/9F., $0.40, 1.25G.)
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122. **Social Development in the South Pacific.** (Report of the Ninth Research Council Meeting.) February 1959.

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**BRANCHES:** Vila, Santo—NEW HEBRIDES.

**Buyers & Exporters of all Island Produce—Distributors & Agents for all Classes of Manufactured Products & Foodstuffs**

**Agents throughout the Pacific for: Queenland Insurance Co. Ltd., Burns Philp Trust Co. Ltd., Shell Co. of Australia Ltd. & Shell Co. (P.I.) Ltd.**

**BURNS PHILP LINE** VESSELS MAINTAIN REGULAR CARGO & PASSENGER SERVICES FROM AUSTRALIAN PORTS TO PAPUA & NEW GUINEA, SOLOMON IS., NEW HEBRIDES, NORFOLK IS., INDONESIA, SINGAPORE & MALAYA.

**INTER-ISLAND VESSELS** ARE ALSO OPERATED WITHIN FIJI, PAPUA/NEW GUINEA, NEW HEBRIDES AND BETWEEN FIJI, NEW HEBRIDES, TONGA & SAMOA.